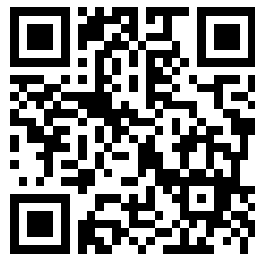

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REID'S
HAND BOOK

TO



NEWCASTLE
UPON TYNE

BY

J. COLLINGWOOD BRUCE LL.D.

ILLUSTRATED



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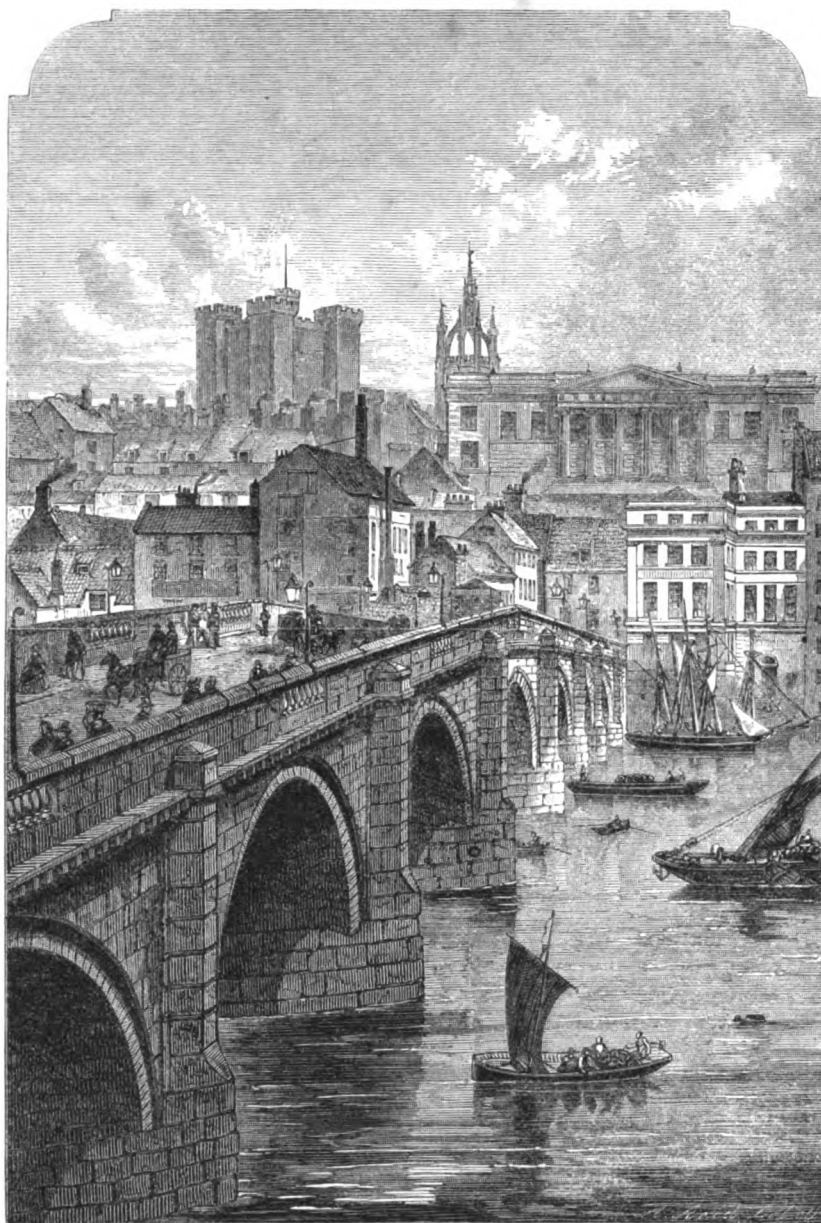
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Newcastle-upon-Tyne from the South

A
H A N D - B O O K
TO
NEWCASTLE-ON-TYNE.

ILLUSTRATED WITH
A Geological Map of the District, Maps of the Town
and of the River Tyne, and upwards of
Fifty Wood-cuts.

BY
The Rev. J. COLLINGWOOD BRUCE, LL.D., F.S.A.



LONDON:
LONGMAN, GREEN, LONGMAN, ROBERTS, & GREEN.

NEWCASTLE-UPON-TYNE:
ANDREW REID, PRINTING COURT BUILDINGS.

1863.



P R E F A C E .

IN preparing the Hand-Book to Newcastle, the writer has chiefly had in view the requirements of a stranger on his first visit to the town. He has not attempted to describe everything that is to be seen, neither, in what he has noticed, has he given way to that fulness of detail which would be necessary in a formal history of the borough. He trusts, however, that he has pursued his theme sufficiently far to give his reader a just idea of the extent and importance of the Town and County of Newcastle-upon-Tyne.

As he has not attempted a history, neither has he affected the gravity of style becoming that species of composition. In imagination he has rambled over the town with an intelligent visitor, and has written what, under the circumstances supposed, he would have said.

Though he has chiefly addressed himself to strangers, he is not without hopes that some of

the facts which he has been enabled to collect respecting men and things, past and present, may be both new and interesting to many who, like himself, have been born and bred in the good old town, and have spent within its bounds more than the average span of human existence.

On addressing himself to his task, the writer felt that it would be incumbent on him to give some account of that wonderful development of the mercantile and manufacturing resources of the district, having Newcastle for its centre, which has taken place during the last quarter of a century. On applying to his friend, Isaac Lowthian Bell, Esq., the present Chief Magistrate of Newcastle, for assistance in this department of his work, he met with so kind a response that he was eventually emboldened to ask that gentleman to undertake the Industrial Chapter himself. The result is, that the reader has before him an account of the commercial resources of this great centre of industry, from the pen of a gentleman long conversant with mines and manufactures, nearly related to some of the earliest and most successful adventurers in chemical and

metallurgic enterprise, and mingling daily with the chief merchants and manufacturers of the Tyne, the Wear, and the Tees. This task he has performed amidst a pressure of duties of unusual magnitude.

There are many other gentlemen to whom the writer, is indebted for information most readily given, and for assistance in various forms most kindly imparted. Gladly would he make his acknowledgments in full, but the narrowness of the limits to which he is reduced forbids it. He cannot, however, omit stating that he is indebted to the accurate pen of John Hodgson Hinde, Esq., for the sections on the early history of the town and its monastic institutions, and that he has obtained from his old friend, John Fenwick, Esq., much of the information that has been given respecting the condition of Newcastle in the Olden Time.

Many of the details given in this volume, particularly in the Industrial Chapter, could only be procured on the very eve of the meeting of the British Association. This circumstance has driven the compilation of a large part of it, and the

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printing of nearly the whole, to the very last moment. Had more time been allowed, the book would have been yet more creditable to the press of Newcastle.

Newcastle-upon-Tyne, August 22nd, 1863.

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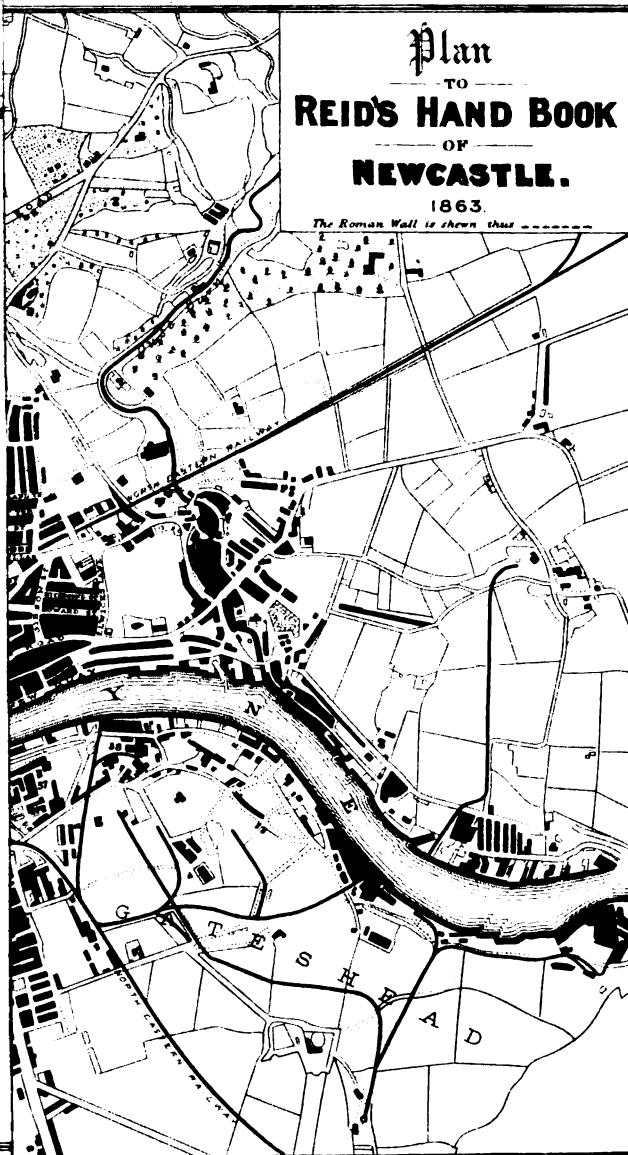
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Plan TO REID'S HAND BOOK OF NEWCASTLE.

1863.

The Roman Wall is shown thus -----



Engraved by A. Reid Newcastle

S. Downing Surveyor



HAND-BOOK TO NEWCASTLE-UPON-TYNE.

GENERAL FACTS.

Geographical Position.—Newcastle-upon-Tyne is situated in latitude $54^{\circ} 58' 11.6''$ N., and longitude $1^{\circ} 36' 36.5''$ W.

Height above the Sea.—The central part of the town is about 100 feet above the level of the sea.*

Style, Size, and Population.—Newcastle was formerly part of the county of Northumberland, but in the year 1400, by a charter of Henry IV., it was made a county of itself, having a Lord-lieutenant, a Sheriff, and a body of

* The bolt in the south jamb of the west arch of St. Nicholas' Church is 100 feet 4 inches above the level of the sea.

Magistrates of its own, under the style and title of "The Town of Newcastle-upon-Tyne, in the County of the Town of Newcastle-upon-Tyne." Previous to the passing of the Municipal Reform Act in 1835, the town and county were identical with the ancient borough. The present Borough, besides the Town and County of Newcastle-upon-Tyne, includes the townships of Elswick, Westgate, Jesmond, Heaton, and Byker, all of which are situated in the county of Northumberland. Its usual designation now is the Borough and County of Newcastle.

The circumference of the borough is 16 miles, and it contains an area of 5325½ acres.

There are in it 632 streets, the combined length of which is about 48 miles, and the number of streets is rapidly increasing, especially in the townships of Elswick, Westgate, and Jesmond. Although Gateshead is identical in its interests with Newcastle, and is only separated from it by the river—which might be expected to be a bond of union between the two boroughs—it is situated in a different county, and has a separate jurisdiction. A blue stone on the Tyne Bridge marks the point of division between them. Notwithstanding this circumstance any account of Newcastle must of necessity include some notice of Gateshead.

When Hutton, in 1772 published his Plan of Newcastle, the town contained about 2,450 houses; or, including Gateshead, 3000. The population of the two towns he reckoned at 30,000.

At present Newcastle contains about 13,000 dwelling-houses, besides churches, chapels, manufactories, and other buildings. Gateshead contains about 4,700; making in all 17,700.

According to the census of 1861 there were, in the Municipal Borough of Newcastle-upon-Tyne, 109,108 inhabitants, and in that of Gateshead 33,587, making together 142,695.

According to the census of 1851, the population of Newcastle was 87,784, and of Gateshead 25,568,—together 113,352; making an increase of the population in ten years of 29,343.

By way of giving a stranger an idea of the size of Newcastle, it may be mentioned that the mains of the Newcastle and Gateshead Water Company are 120 miles long, and that the mains of the Gas Company are about 110 miles.

In 1772, Hutton tells us, "the streets within the walls were illuminated with above three hundred lamps." Now, the number of public lights in the borough is 2170.

Revenue.—The ordinary revenue of the Borough of Newcastle during the year ending 31st August, 1862, was £58,642. In addition to this, money obtained from other sources raised the whole receipts within the twelvemonth to £116,887. Amongst the more important items of ordinary income during that year were the following:—

Dues on Coals and Cinders.....	£12,438
Thorough Toll.....	3,736
Markets	2,272
Rents derived from Land, Collieries, &c..	12,712
Watch, Lighting, Paving and Watering, Sewerage Rates, and similar sources....	19,439
Town Improvement Rate, which is not considered as a part of ordinary income	3,447

It is needless to add that the Corporation find no difficulty in expending their resources. The following items occur under the head of last year's payments:—

Making, repairing, and scavenging Streets, Roads, and Lanes	£13,726
Watching the Borough	10,194
Sewerage of the Borough	5,462
Lighting the Borough.....	4,005
Paving and watering the Borough	3,179

It is an exceedingly difficult thing to give an old town all the sanitary advantages which modern science has suggested; no effort is being spared to effect all that can be accomplished in this respect.

As another means of estimating the comparative importance of the town, it may be stated that the annual income of those of its inhabitants who are liable to the income tax is esti-

mated by the officers of inland revenue at upwards of a million of pounds (£1,070,538). The following are the exact returns:—

Annual Value of Property assessed under Schedule A of the Income Tax, in Newcastle-upon-Tyne, in the year ended 5th April, 1862.

Lands, Houses, &c.	£231,384
Railways, Gas and Iron Works	168,756
Other Property	55,190

£455,330

Amount of Profits derived from Trades and Professions charged to duty under Schedule D, in Newcastle-upon-Tyne, in the year ended 5th April, 1862.

Incomes under £150 per annum charged to duty at 6d. in the £	£41,151
Incomes above £150 per annum charged to duty at 9d. in the £	574,057

£615,208

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HISTORY OF THE TOWN.

THE river Tyne appears, at the earliest historical period, to have marked the boundary between the territories of the Brigantes and the Ottadeni, several of the towns of the latter people being placed by Ptolemy a little to the south of it, but none to the north. The site of modern Newcastle was thus within the country of the Ottadeni, but it was, as far as we are informed, undistinguished from the surrounding district by the existence of town or fort. We have evidence, indeed, from the sepulchral remains which have from time to time been disinterred, that the neighbourhood was not without

inhabitants, but nothing to denote the seat of a dense population.

The origin of Newcastle is due to the Romans, under whom it occurs amongst the stations on the line of the Wall of Hadrian, garrisoned by a cohort of Cornovii, and bearing the title of Pons Ælii, in honour of its imperial founder, who was of the Ælian family.

In Saxon times, a town sprung up to the eastward of the station, under the name of Pampendon or Pandon, which is believed to have been identical with the royal village of Ad Murum, celebrated by Beda as the residence of Oswi King of Northumberland, and as the scene of the baptism of two illustrious converts to Christianity, Pæda, the son of Penda King of Mercia, and Sigebert King of the East Saxons. Beda describes Ad Murum as situated twelve miles from the mouth of the Tyne, which, measured by the course of the river, exactly coincides with the position of Pandon, but is totally irreconcilable with that of any other site to which, on etymological grounds, these events have been referred. The exactness of Beda in other instances in which he defines distances from place to place (*a*), forbids us to assume that in this case he speaks with the conventional laxity of Symeon of Durham, and other later writers, whose computed mile often exceeds the true measure by fully one-half. Neither, if we confine ourselves to etymological evidence alone, is the affinity of the name of any suggested site closer to Ad Murum, than that of the acclivity at Pandon, which has been immemorially known as Wall-Knoll.

At a later period, the protection of the walls of the deserted Roman station of Pons Ælii offered an inducement to its

(*a*) In his Ecclesiastical History (B. ii., C. iii.), he gives the distance between Rochester and Canterbury, 24 miles, with as minute accuracy as the engineers of the Ordnance Survey. Again (B. iv., C. xvi.), he gives the correct breadth of the Channel between the Isle of Wight and the main land, 3 miles. A third instance occurs (B. iv., C. xxvii.), in which he gives the distance from the church of Lindisfarne to the island of Farne as "almost 9 miles." Here, instead of his miles being too long, they are apparently too short, the distance in a straight line being only 7 miles; but the circuit which a vessel must necessarily make to clear the rocks and islets, agrees exactly with our author's statement, "almost 9 miles." In the same way, the distance in a straight line from the mouth of the Tyne to Pandon is less than 12 miles; but Beda gives the shortest practicable distance, which in his time was the river route. It is true a traveller might proceed along the line of the Roman Wall from Pandon to Wallsend, but from thence to Tynemouth there was no practicable route so late as the middle of the 17th century, whilst several deep ravines, and at least one tidal estuary, intervened.

colonisation by a community of those monks who flourished in so many parts of Northumberland under her early Saxon kings, and who afterwards suffered so cruelly from the invasions of the northern and piratical Danes. This settlement still retained the name of *Monkchester, the fortress tenanted by monks*, at a date subsequent to the Norman Conquest, and is known to us in connection with the revival of monachism in the north. This was undertaken by a pious individual, by name Aldwine, in company with two brethren of the monastery of Evesham, who directed their steps in the first instance to Monkchester, in hopes of finding some remains of its former colonists. In this they were disappointed; and perceiving the place to be utterly ruinous and deserted, they betook themselves first to Jarrow, and thence, after an interval, to Durham, where they were finally established, to the exclusion of the secular clergy, who had hitherto ministered in the Cathedral.

An early biographer of St. Oswin represents Monkchester as so poor a place at this period, that when William the Conqueror was compelled to halt there, on his return from his Scottish expedition in 1072, the royal army might have perished by famine, but for the opportune proximity of the storehouses of the church of Tynemouth. This was two years prior to the visit of Aldwine and his fellow monks.

The bridge, from which the station of Pons Ælii took its name, was destroyed, and the population probably was confined to Pandon, which is described at a later period as "a little fisher town." Newcastle is indebted for its resuscitation under its present name to the foundation by Robert, eldest son of William the Conqueror, during his father's lifetime, A.D. 1080, of a fortress, which was called the New Castle, in contradistinction to the old Roman structure of Pons Ælii, on nearly the same site. The restoration of the bridge, of which the ancient piers yet remained, was probably effected at the same time, being, indeed, a necessary appendage. Under the shelter of the New Castle, William Rufus laid the foundation of the present borough a few years later. In the words of Hardyng, the old metrical historian,

He builded the Newcastle-upon-Tyne
The Scottes to gainstand, and to defend
And dwell therein. The people to incline
The town to build and wall as did append,
He gave them ground and gold full great to spend,
To build it well, and wall it all about,
And franchised them to pay a free rent out.

Privileges were granted, and laws established peculiarly favourable to the rapid growth of the infant community. Of these we possess an authentic record as they existed in the reign of Henry I., and as they were adopted by David King of Scotland in legislating for the commercial towns of his own kingdom, "the Laws of the Four Boroughs" of Scotland being, in their essential parts, an exact copy of "the Laws and Customs of Newcastle-upon-Tyne" (a). They are accompanied by a table of tolls on articles of merchandise, the variety of which fully demonstrates that the commerce of the Tyne, even at this early period, was far from inconsiderable.

The prosperity of the town was further promoted by the establishment, about the same period, of several religious foundations within it, with their usual concomitants of retainers and provision dealers.

During the reign of Stephen, when Northumberland and Cumberland were vested in the royal family of Scotland, Newcastle was frequently favoured by the residence of Henry Earl of Northumberland, and his father King David, and many of their charters and other public instruments are dated there.

After the accession of Henry II. to the throne of England, he would no longer acquiesce in the retention of the important border fortresses of Newcastle and Carlisle in the hands of the Scots, but insisted on their immediate restoration, notwithstanding the personal obligations which he owed to the Scottish king and his father. Having resumed possession of Newcastle, he granted a new charter to the burgesses, and advanced its

(a) The Laws and Customs of Newcastle, and the Laws of the Four Boroughs, are both printed at length in the Acts of Parliament of Scotland, published by the Record Commission.

prosperity, amongst other measures by the establishment of a mint within the town, in connection with the productive lead mines of Cumberland, from the ores of which large quantities of silver were extracted, the same party being at once the lessee of the mines and the patentee of the mint (*b*).

King John confirmed his father's charter, and at various times on the receipt of fines, the magnitude of which denotes considerable municipal opulence, granted new privileges. The burgesses were allowed to hold their town in fee-farm at a fixed rent; a merchant's guild was established; and an annual fair at Lammas was conceded, which has been held uninterruptedly to the present day.

The charters of John were confirmed and enlarged by Henry III., who, amongst other privileges conceded to them on payment of one hundred marks this singular one, that in future no Jew should reside amongst them. In this reign an important change was made in the government of the town, which was henceforth vested in a Mayor, chosen by the burgesses, in lieu of a Provost, appointed by the Crown. The royal revenues within the borough were still received by the King's bailiffs, four of whom were appointed annually. Afterwards, the customs revenue was transferred to customers specially entrusted with this duty, and finally the bailiffs were abolished altogether, and their remaining functions were committed to a Sheriff, who, like the Mayor, was chosen by the burgesses out of their own body. This last change was not effected till the reign of Henry IV., from which period Newcastle has enjoyed all the privileges of a distinct county, rendering its fee-farm rent and other dues at the Exchequer through its own officer, without the intervention either of a Crown Bailiff or of the Sheriff of Northumberland.

During the reign of Henry III. a great impetus was given to commerce by the opening out, if not the original discovery, of the mineral wealth of the district, which has, through all

(*b*) The lead mines of Cumberland were discovered about the 30th of Henry I. A mint was established at Carlisle by Earl Henry, and transferred to Newcastle by Henry II.

succeeding ages, identified the prosperity of Newcastle with the coal trade.

Under the first three Edwards, Newcastle became the principal rendezvous for the vast armaments which were mustered by these princes for their expeditions into Scotland, and during their reigns its population would no doubt have been prodigiously increased, but for the prevalence of the plague, whose ravages were as severely felt here as in any part of the kingdom. At the close of this period, we have the means of ascertaining the actual and relative population of all the principal towns in England, from the records of the collection of the Poll-Tax in 1377.

Newcastle stands twelfth on the list, the numbers assessed to the tax being 2647, to which the addition of one-third, representing those who were not of taxable age, gives a total population of 3970, say 4000 souls. London, by the same computation, contained about 35,000 inhabitants; York, 11,000; Bristol, 9500; Plymouth and Coventry, upwards of 7000 each; Norwich, 6000; Lincoln, upwards of 5000; Salisbury, nearly 5000; Lynn, Colchester, and Beverley, in round numbers, 4700, 4500, and 4000 respectively.

It would far exceed the limits of this little work to record the various negotiations which were carried on, the truces which were arranged, and the treaties concluded in Newcastle during the Scottish wars. Here Baliol did homage to Edward I. for the crown of Scotland, in the hall of the Castle, on the 26th of December, 1291, as his grandson Edward Baliol did to Edward III., in the chapel of the Black Friars, in 1333; here one of the quarters of the mutilated body of Sir William Wallace was exposed to view on a gibbet, in 1305. A similar sad spectacle was again presented on the execution of Andrew de Hartclay Earl of Carlisle for treason, in 1323, and was repeated in violation of the remains of the Earl of Northumberland, the father of Hotspur, after his defeat at Bramham Moor, in 1408.

From the period of its foundation, the borough appears to have been surrounded by walls; but these proved inadequate to the protection of the inhabitants from sudden attacks by

B

the Scots, and did not include the extensive northern suburb. New walls were consequently commenced, on a scale of unusual strength and magnitude, in the reign of Edward I., and were completed in that of Edward III. These included not only all the buildings within the recognised limits of the borough, but also the ancient villa of Pandon, which was acquired by purchase, under the authority of a royal license, obtained in the last year of the thirteenth century. Leland says — “The strength and magnificence of the walling of this town far surpasseth all the walls of the cities of England, and most of the towns of Europe.” The completion of this great work, the comprehension of Pandon within the municipal limits, and the establishment of the whole as a separate jurisdiction, under the style of the Town and County of the Town of Newcastle-upon-Tyne, render the commencement of the fifteenth century the culminating point in a course of steadily advancing prosperity ; and it is probable that Newcastle now exceeded many of those towns, both in wealth and population, which stood higher in the scale in the comparison which we were able to institute a quarter of a century previously. In the reign of Henry VIII. it numbered on its muster-roll 1907 able-bodied men ready for military service, which implies a population approaching 10,000, and it may be doubted whether the number was greater on the union of England and Scotland a century later.

In the meantime, it had suffered severely from the annihilation of its numerous religious foundations at the Reformation, which was a blow from which, notwithstanding the encouragement given to its commerce in the reign of Elizabeth, it did not speedily recover.

In 1552, whilst the See of Durham was in abeyance, in the reign of Edward VI., Gateshead was annexed to Newcastle ; but on the accession of Mary, and the reestablishment of the bishopric, this brief connection was dissolved.

During the reigns of James I. and his son, Newcastle had many merchants of great opulence ; but few towns suffered more severely during the Civil Wars, in which the feelings of the inhabitants were strongly manifested in favour of the

royal cause. The occupation of the town by the Scots after the battle of Newburn, the disastrous siege a few years later, and the consequent interruption of the coal trade, combined, with sequestrations and compositions, to impoverish the inhabitants. Here the unfortunate monarch was detained by the Scottish army, to whom he had confided his person, until he was delivered up to the English Parliament, and hurried to Holdenby House, in Northamptonshire, the first stage in his brief journey, which terminated on the scaffold at Whitehall.

By degrees Newcastle emerged from her difficulties, and her staple trade revived, although she no longer possessed it as a monopoly. The deficiency of the supply of coals during the Civil Wars from the Tyne, fostered the export from Sunderland, and the competition once set on foot was vigorously continued.

At the commencement of the eighteenth century, we find from the registers that the baptisms within the four parishes of Newcastle averaged 599, and the burials 609, from which we may infer a population of 18,000, which increased steadily, but not rapidly, till the period of the first Government census in 1801, when the numbers amounted to 28,294.



MILITARY WORKS.

THE Old Castle is a building of peculiar interest, and, probably, displays better than any other structure in England the military genius of the Norman period. The site upon which it stands is naturally strong, and must have commended itself to military architects of every age. Whether the Ancient Britons here reared one of their rude fortresses there is no evidence to show, but the Romans undoubtedly took possession of it. When the foundations of the County Courts were dug in 1810, various marks of Roman occupation were found. Amongst them were two altars, coins of Antoninus Pius, part of a shaft of a Corinthian pillar richly fluted and of exquisite workmanship, large quantities of pottery, fragments of millstones, and

foundations of walls firm and impenetrable as the hardest rock. A well of Roman masonry was also discovered which is still preserved; it is near the centre of the Court-house. The present castle is not the first that was reared after the departure of the Romans. Whether the Saxons fortified the spot does not appear. Robert, Duke of Normandy, the eldest son of the Conqueror, on his return from an unsuccessful expedition into Scotland in 1080, is recorded to have built a new castle (*novum castellum*) upon the river Tyne. As Robert's structure seems speedily to have disappeared the probability is that it was a timber erection. Hovedon applies to it the disparaging term of *municipula*, or a fortlet. A second and a much stronger castle was erected here by Robert's youngest brother, the Red King. Hardyng, the chronicler, gives us an interesting account of the erection of this structure, around which it would appear the inhabitants of the district were disposed to cluster for safety. The method adopted by Rufus of procuring the "ways and means" is an early instance of the appropriation of ecclesiastical revenues to secular purposes. His verses (the first of which has been already quoted) are—

He buylded the Newcastell vpon Tyne,
The Scottes to gainstand and to defend,
And dwel therin : the people to incline
The town to build and wall as did append,
He gave them ground and gold ful great to spend,
To buylde it well and wall it all about,
And fraunchised them to pay a free rent out.

The rentes and frutes to th' archbishop perteinyng,
And to the bysshoppes of Wynchester and Sarum,
And also of nyne abbeys lyvelod conteynyng,
In his handes seazed and held all and some,
But for his workes and buyldynges held eche crome,
With whiche he made Westmynstre hall
And the castel of the Newe Castell withall,

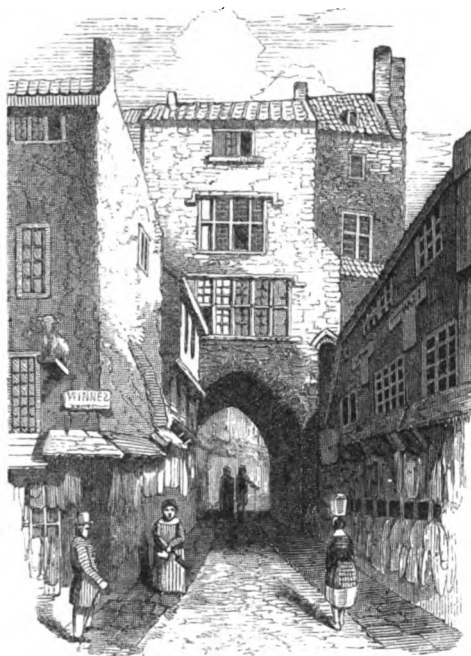
That standeth on Tyne, therin to dwel in warre,
Agayne the Scottes the countree to defende,
Whiche, as men sayd, was to hym mekill deer,
And more pleasyng than otherwise dispende,
And mucche people for it did hym commende,
For cause he dyd the commen wealthe sustene,
His marches vnnunerable to mayntene.

The date which Stow assigns to King William's Castle is 1090. It could not have been much later, for in 1095 Robert Mowbray, Earl of Northumberland, who had risen in rebellion against the king, took refuge in it. The king, collecting his forces from all quarters, laid siege to the Castle and took it; Mowbray, however, escaped for a time.

It is doubtful if any part of the castle of Rufus remains. If there be any portion, it is a part of the outer wall near the railway bridge. The style of the architecture of the present keep is late Norman. Fortunately in the Pipe Rolls for Northumberland, are several entries respecting the Castle which fix the date of the erection of the keep. In the year 1172 £16 14s. were expended "*in operatione turris Novi Castellii super Tinam*;" in 1173, £240 5s. 4d. were expended upon the works, and £5 in provisioning the castle; in 1174 the expenditure was only £12 15s. 10d.; in 1175, £186 15s. 4d.; in 1176, £144 15s. 4d.; and in 1177, £141 12s. 11d. In order rightly to estimate the value of this money, it should be borne in mind that at that period an ox was worth about 3s. and a ram 8d. The date of this expenditure corresponds with that of the style of architecture adopted in the keep. Such large sums would not be required merely for the reparation of Rufus' building. The present keep may therefore with certainty be said to have been erected between the years 1172 and 1177, and to have cost £892 18s. 9d. Mr. Longstaffe, from whose able paper on "The New Castle upon Tyne," in the 4th volume of the New Series of the *Archæologia Æliana*, these details are taken, conceives that the £5 expended in provisioning the Castle in 1173, and the small expenditure in 1174, may be explained by the expeditions into England in those years of William the Lion. During the greater part of the latter year the works were entirely interrupted. On the morning of Saturday, July 13th, however, the Scottish king was surprised, taken prisoner in the vicinity of Alnwick, and lodged for the night in the castle of Newcastle. The works here were evidently not sufficiently advanced to warrant his

being permanently detained in it; for we find that next day he was carried to Richmond. The building of the keep was not again interrupted.

A mediæval castle consisted not only of the keep or tower, to which in modern times we are disposed to apply the term, but of the whole fortification, of which the keep was the centre or place of last resort. The platform of this castle embraced an area of three acres. A curtain wall enclosed the whole of this space and was entered by one main gateway called the Black Gate. There were besides



The Black Gate.

three minor gates—posterns. When the ground was not precipitous the curtain wall was strengthened by a deep

ditch on the outside. The buildings on the right hand of the woodcut have been removed since the drawing was made.

A glance is sufficient to show that the Black Gate is of later date than the other parts of the castle, its arches being pointed. The main entrance to a castle must always be the part most exposed to the brunt of war. It would seem that this gateway required renewal at an early period, for the present structure appears to have been erected by Henry III. in the year 1248, at an expense of £514 15s. 11d. The upper storeys of the gate are manifestly of more recent construction. In front of this gateway was a fosse, protected by a drawbridge. It had also, as Bourne tells us, two portcullises. In passing along the archway, it will be observed that the stone vaulting is omitted for a short space, both on the inner and outer side of the gate. This was to enable the garrison to pour down upon an enemy, endeavouring to force a passage, such missiles as might be at hand, or such offensive materials as boiling pitch, melted lead, or quick lime. Many of the details of this gate will repay examination.

Passing this tower we are in what is called the outer bailey of the Castle. The principal buildings occupied by the garrison were situated in it. The great hall of the Castle also stood in this bailey, on the site where the Bricklayers' Hall and contiguous buildings now are. The last remains of it were removed in 1846; they were Early-English in their character.

Two of the posterns remain; one at the head of the Dog Loup Stairs, leading down to the foot of the Side, the other at the head of the Castle Stairs, leading down to the Close. The latter is still crowned by a circular arch; if this be original, we have here the only Norman postern in the kingdom.

In addition to the outer or curtain wall, the keep seems to have been protected to a greater or less extent by an inner wall. Bourne tells us that "there were two great strong walls which surrounded the Castle. The interior wall was

at no great distance from the Castle itself, as may still be seen in several places." A considerable portion of this interior wall, on the western side of the Castle, together with the gateway by which an entrance was obtained into the inner bailey, was standing in 1813. The last remains of it were removed when the railway viaduct was constructed.

We now approach the keep. It was the policy of the Norman architects to avoid having any entrance into the building on the ground floor. The present door in this position is modern. The original entrance is on the third storey. In order to protect the stairs by which the grand entrance is approached, a distinct wing is attached to the side of the keep. The chapel is placed on the basement storey of this wing, the whole of which might be in possession of an enemy without the integrity of the keep being infringed upon. There is a doorway into the chapel on the ground floor. It is wider now than it was originally. It has been protected by two doors, the outer one being of iron. Immediately above this doorway is a small recess in the wall, which has been provided with a balcony. This has, apparently, been constructed for the especial defence of the doorway below. At the back of the recess is a trough, having a channel which communicates with the battlements above. Has this arrangement been intended to keep up a supply of scalding water or oil, to be ladled out as occasion served upon assailants attempting to force the door below?

As we ascend the stairs we can readily conceive how difficult it would be to do so were the gates strongly barricaded, and the walls manned with a hostile force. Two holy water stoops are placed here—one on the left hand, immediately after passing the gateway, the other higher up on the right. The Norman invaders of England felt that they needed frequent purification. The door and window on our left hand, which so much interfere with the military strength of the Castle, were originally only arrow loops. A somewhat elegant room near the top of the stairs, which has recently been renovated after the original model, is probably the place

where persons having business with the commander of the Castle showed their credentials. Some, however, suppose it to have been the priest's chamber. The woodcut exhibits the room as it was before the alterations. Several



The Audience or Priest's Chamber.

Roman antiquities, derived from the Wall, are placed on the battlements. The entrance gateway is of ornate design. It is an exact copy of the original. On entering, the thickness of the Castle wall will be noticed. The iron bar which fastens the door was bent, as it now appears, by the explosion which occurred at Gateshead on the morning of the 6th of October, 1854. We are now in the great hall of the Castle, in which all public business was despatched. It is generally supposed that there was another floor above the present one. A gallery runs round the whole building near the top, communicating, as will be seen by round-headed apertures, with the great hall. The banners which hang around are intended to represent the banners of the men who figured in the early history of the Castle. Several Roman antiquities are on the floor: they consist of a figure of Victory, soldiers, and *Dea*

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Matres. There is also a slab from the gateway of *Habitancum*, the modern Risingham, on which have been inscribed the names of Septimius Severus, and of his two sons Caracalla and Geta; the name of Geta has been erased, in consequence of orders from Rome, after his murder by his elder brother. The window in the north wall is original: it is worth examining, both from the inside and out. The fireplace is not original. Several chambers, in the thickness of the wall, communicate with the great hall. In the south wall is one which has long been popularly called the king's

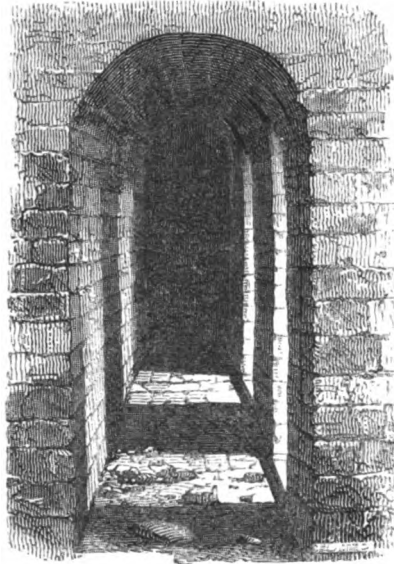


The King's Chamber.

chamber: some small private chambers communicate with it. The well-room is near the door of entrance. It will be observed that the pipe of the well opens upon the third storey, being cased up thus far in the solid masonry of the building.

The well is 94 feet deep. The engineers of the Castle have evidently contemplated the possibility of the lower part of the building falling into the hands of the enemy, while the garrison still held possession of the upper portion. To diminish the inconvenience of the whole of the water required by the garrison being raised to this height, channels are placed on each side of the chamber, which conduct the water to the lower parts of the building.

On the 26th December, 1292, John Baliol, King of Scotland, did homage for his crown to Edward I. in the great hall of the Castle—"in aulâ palatii ipsius Domini Regis infra castrum." This important ceremony must either have taken



The Gallery.

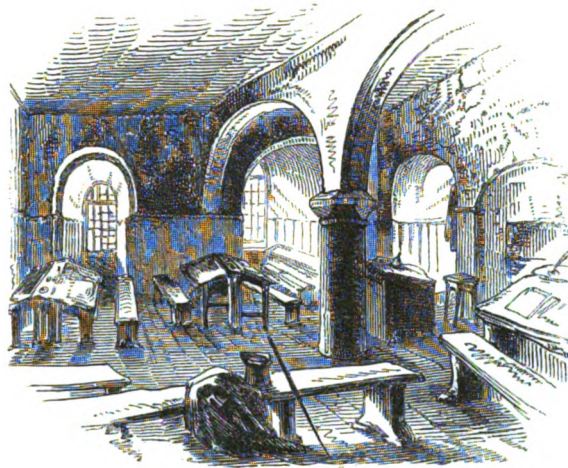
place here or in the hall in the outer bailey. Mr. Longstaffe considers the latter proposition to be the most probable. Leaving the hall by the small doorway in its south-east

angle, a newel staircase is seen on our right hand : it goes from the bottom to the top of the Castle, and is the only one which does so. To avoid going over any part of the ground twice, we will take the longitudinal staircase on our left hand, and go to the top of the Castle—returning by the other. It will be well for the visitor to make the circuit of the gallery (shown in the preceding cut), which he meets with when near the top, and from it to look down upon the great hall.

The view from the summit is extensive. The river with its two bridges, St. Nicholas Church with its elegant steeple, the railway station with its lines diverging in all the directions of the compass, and the town with its teeming population, are interesting objects of examination. The line of the western turnpike will be discerned ascending Westgate Hill—it indicates the course pursued by the Roman Wall in its way to the Solway Firth. The manner in which in this Castle ancient things are brought in contact with the most remarkable appliances of modern discovery, renders a visit to it fruitful of thought. The roof of the Castle, its battlements and flag-tower, are all modern, and are not in character with a Norman building.

Descending by the newel staircase, which we formerly declined, we come shortly after passing the floor of the great hall to the little chamber which is placed immediately over the entrance into the chapel, which has already been described. The next door that we come to is a modern one, and must be avoided. A little below this we come to the proper entrance into the second storey of the castle. It will be observed how jealously it is guarded. We are made to descend several steps below the level of the floor, in order that an enemy might enter at a disadvantage. The doorway is very narrow, and instead of taking us into the body of the room it lands us in a window-niche. This entrance could be defended by one man against a thousand. The rooms on this floor are the most secure and most comfortable in the castle. Here, doubtless, the chief personages resorting to the castle lodged. The principal room is now used by the Society of Antiquaries of Newcastle as their council

chamber. The woodcut shows it as it was when used as a Corporation school. The fire-place is not original, the windows have been enlarged, and an opening which destroys the security of the principal apartment has been broken in the wall nearest the stairs of entrance. The library and the minor objects of antiquity, belonging to the Newcastle Antiquarian Society, are kept in this room. The President's chair is



The Commandant's Chamber.

made of oak, which was found near Port Carlisle, below the foundation of the Roman Wall; it must, therefore, be at least as old as the Christian era. The table was made of a mass of oak, which was dredged up from beneath the bed of the River Tyne, and is also supposed to belong to the primeval period. The chamber into which an entrance has been forced through a wall four feet thick has originally been intended for the accommodation of a small company of soldiers, whose business it was to defend the stairs of entrance. They entered from the staircase by a low narrow doorway, which stood where the present large doorway now is. Amongst the Roman inscribed stones in this chamber are a



slab from the Roman Wall, on which is carved the name of Hadrian, and his personal friend, Aulus Platorius Nepos; a fine altar to Fortune from Risingham; and a Mithraic tablet from the Mithraic cave at Housesteads. There is a chamber in the north wall of this storey similar to that in the south wall of the storey above. Here too is an original fire-place, this and the one in the corresponding chamber above being the only ones in the Castle. This room is at present appropriated to the reception of Roman monumental stones. One of them it will be observed is dedicated to the Divine Shades of Aurelia Faia by her husband, Aurelius Marcus, a centurion. The weeping husband states that his most holy wife (*conjux sanctissima*), who attained the age of 33 years, was a lady destitute of blemish! (*quæ vixit annis xxxiii sine ulla macula*).

We now descend to the ground floor by a narrow and

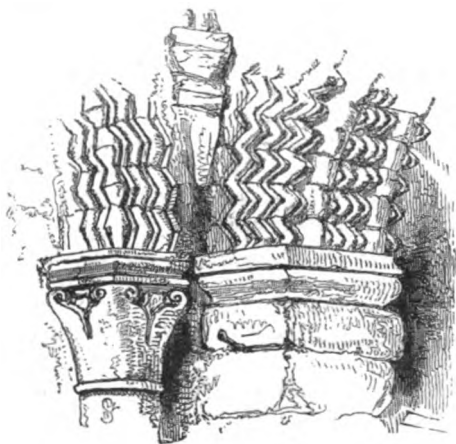


The Dungeon.

tortuous passage which leads out of this chamber. Before coming to a dark apartment which has probably been used for storing up provisions, it may be well to notice the stone

curtain which drops from the roof to arrest the flight of arrows entering by the arrow loop opposite to it. Similar contrivances partially veil the windows in the guard chamber, which we now enter. This is a very elegant apartment. A central column expanding above into six ribs supports the roof. The column is hollow, and through it the water was conveyed from the well-room above; the pipe of exit is seen. The windows were originally much smaller than they now are. The felons undergoing trial were confined here during the Assizes. The staples to which they were chained remain. It was customary to exhibit these unhappy persons on the "Assize Sunday," to curious visitors, at 6d. a head. Ascending the stairs which lead to the south window, we enter a small chamber which takes to the sallyport. The whole of the arrangements in this part of the Castle are exceedingly curious. Immediately opposite the window, in the chamber just referred to, and solidly lodged in the joint of the masonry, is the head of an arrow shot from a cross bow — an interesting relic of ancient warfare. In this chamber the sallying party was no doubt marshalled. Leaving the guard chamber, in which, in time of a close siege, the garrison would be lodged, we come into a chamber that has no window, but is provided with two holes for the admission of air. This may have been a prison. There is at present upon its floor an ancient British grave, found near Lesbury. It may be doubted whether the doorway, which now admits us into the chapel, originally existed. Going through it, we pass out of the keep into the wing which protects the stairs of entrance. The chapel is an exceedingly beautiful specimen of late Norman architecture. Before the Castle came into the hands of the Corporation, it was used as the beer cellar of the Three Bulls Heads public house. It is in an astonishingly good state of preservation; for an experienced eye will at once see that nearly the whole of what he so much admires is of ancient workmanship. However artistic the effect, the work has not the mechanical nicety that a modern mason would give it. The woodcut shows the general

style of its decoration. Preserved here are a wooden coffin from the neighbourhood of Featherstone Castle, made apparently before the use of iron was known to the inhabitants



of these northern parts; several ancient tombstones of the Christian period; a very interesting fragment of a churchyard cross of the Saxon era, from Rothbury; a plaster cast of some early Norman carvings, from St. Andrew's; and some stone coffins from the vicinity of the railway station.

King James I. made a present of the Castle, on his coming to England, to one of his favourites.

During the Civil Wars the inhabitants of Newcastle declared for King Charles I. The town was, in consequence, besieged by the Scottish army in 1644. After being compelled to surrender the town, the Mayor, Sir John Marley, retreated, with several of his associates, to the Castle, which he held against the enemy for several days with great gallantry. At one time this building, which has so often been the abode of royalty and the scene of so many stirring events, was in danger of being converted into a windmill. In 1812 the Corporation of Newcastle bought it for 600 guineas, and put it into a state of complete repair.

It is now occupied by the Society of Antiquaries of Newcastle, who have made arrangements for rendering it easily accessible to all who wish to read in its suggestive walls the history of one of the most fruitful eras of our nation.

The Castle Garth, though within the limits of the town and county of Newcastle, was formerly in the jurisdiction of the county of Northumberland. During the Middle Ages, when none but freemen could carry on trade in the town, strangers were constrained to erect their stalls and carry on their business here. Encroachments, in course of time, became legal possessions, and the trade in old clothes and second-hand shoes, which still so largely prevails within the precincts of the Castle, became established.

The Walls.—According to Hardyng, in a passage already quoted, William Rufus was the first to surround the town with a wall. From his time, until the reign of George I., the walls underwent frequent reparations, and were made gradually to embrace a larger area. The most important works were effected in the reign of King John, and in the reigns of Edward I. and Edward III. In 1402 nightly watches were kept up upon them by one hundred persons, at the charge of the inhabitants.

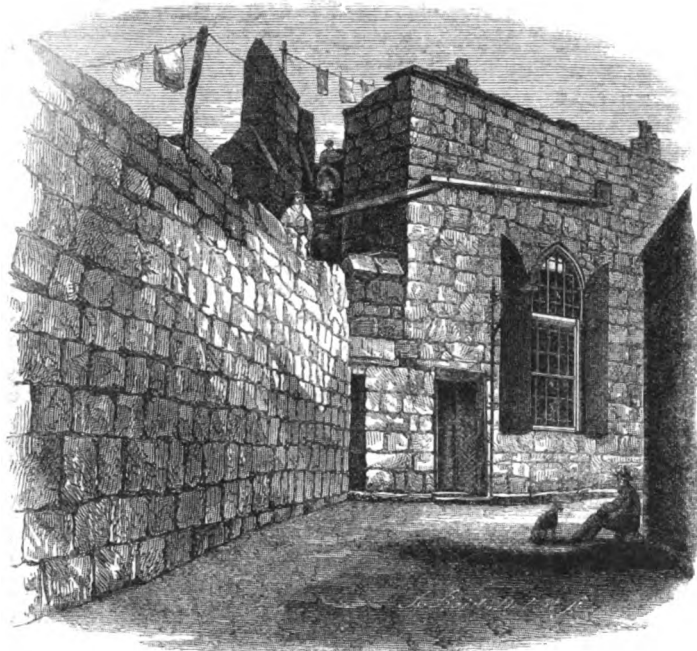
In 1745 the whole circuit of the walls was 2 miles 239 yards. The wall was 8 feet thick and 12 feet high. At its various angles it was strengthened by towers; and at the principal entrances into the town, gateway towers were planted, each of them having gates of oak, iron doors, and a heavy portcullis.

The union of Scotland with England rendered the walls unnecessary. The portion that ran along the quay, from the Sandhill to Sandgate, was the first to be removed, as it interfered most materially with the operations of commerce. This was taken down in 1762. Other parts followed, as convenience or necessity dictated. Pilgrim Street gate, a gloomy fortress, which separated Pilgrim Street from Northumberland Street, was taken down in 1802; and Newgate, the strongest and grandest of all the gates, and which was

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long used, as the Newgate of London now is, as the town's prison, fell before the march of improvement in 1823.

Probably the last occasion on which the walls and gates of the town were made available for defensive purposes was



Heber Tower, with part of the West Wall.

in 1745, when the Pretender threatened the town. John Wesley, who was here at that time, writes, under date of Sept. 20th:—"The Mayor ordered the townsmen to be under arms, and to mount guard in their turns, over and above the guard of soldiers, a few companies of whom had been drawn into the town on the first alarm. Now also Pilgrim Street gate was ordered to be walled up." Next day the news of General Cope's defeat reached town, and

he writes :—"Orders were now given for the doubling of the guard, and for walling up Pandon and Sallyport gates." His diary of the 22nd states :—"The walls were mounted with cannon, and all things prepared for sustaining an assault." The Orphan House, in which he resided, was outside the walls, in Northumberland Street. It was in reference to this fact that he writes the following interesting passage :—"All this week the alarms from the north continued, and



The Walls, with Mordon Tower.

the storm seemed nearer every day. Many wondered that we would stay without the walls; others told us we must remove quickly, for if the cannon began to play from the top of the gates they would beat all the house about our ears.

This made me look how the cannons on the gates were planted, and I could not but adore the providence of God, for it was obvious—1. They were all planted in such a manner that no shot could touch our house; 2. The cannon on New Gate so secured us on one side, and those on Pilgrim Street Gate on the other, that none could come near our house either way without being torn in pieces.”

The only gate now standing is the Sallyport Gate, in Causey Bank. The portions of the wall which remain are the following:—1. A strip, in some places nearly perfect, extending from the river's edge across the Close (where the Close Gate stood), and along the back of the Hanover Square brewery to the railway. 2. Opposite the railway station is a lane called Pink Lane, in which Pink Tower stands, and a portion of wall on each side of it. 3. Crossing Westgate Street (where the West Gate stood) we come to an interesting specimen of the wall, which is continued almost without interruption as far as St. Andrew's Church. In the course of this distance we pass Durham Tower, Heber Tower, Mordon Tower, and Ever Tower. Two views of this part of the wall are given in the preceding pages. At the back of St. Andrew's Church is a picturesque turret. 4. In New Bridge Street Carliol Tower still stands in a very complete state. 5. Plummer Tower is near the gaol, but it has been much altered.

THE ANCIENT CHURCHES.

THE town is comprised in the parish of St. Nicholas, which also includes part of the county of Northumberland. The town has, time out of mind, been divided into four parochial



St. Nicholas.

chapelries — St. Nicholas', All Saints', St. Andrew's, and St. John's. St. Nicholas' Church is the mother church, and claims, within certain limits, jurisdiction over the others. The Vicar of Newcastle, who is incumbent of St. Nicholas, has the right of presentation to the other churches. The livings of the other churches are perpetual curacies. Sir M. White Ridley, Bart., M.P., was lately lessee of the great tithes of the whole Parish of St. Nicholas, which now belong to the Ecclesiastical Commissioners. Until recently the gift of the living of Newcastle was in the hands of the Bishop of Carlisle.

The origin of this anomalous circumstance is explained by Leland. He tells us that one Walter, a Norman priest, whom William Rufus set over the city of Carlisle, began to build the monastery there in honour of the blessed Virgin, but that Henry I. completed it, and gave six churches to the monastery, namely, Newcastle, Newburn, Warkworth, Rothbury, Whittingham, and Corbridge. The present Vicar of Newcastle is the Rev. Clement Moody, M.A., who was presented to the living in 1853, by the Hon. Hugh Percy, Bishop of Carlisle. Since this presentation took place, an arrangement has been made enabling the Bishop of Durham to present for the future to the vicarage of the chief town in his diocese.

St. Nicholas' Church.—The early history of St. Nicholas' is hid in obscurity. Probably, shortly after the departure of the Romans, a rude church was erected on the site of the present structure out of the ruins of the Roman buildings which encumbered the ground. There is no record of a Saxon church. Tradition speaks of a Norman church, founded in the reign of William Rufus, which was destroyed in the year 1216. The present church, which is mostly of "decorated" character, was finished in 1350. It has undergone many changes, which have greatly altered its first appearance. The steeple is manifestly an addition to the original tower. The following description of the church, by Grey in his "*Chorographia, or a Survey of Newcastle-upon-Tyne*," published in 1649, has at least the merit of brevity. "Saint Nicholas, in the mid'st of the Towne is a long faire, and high Church, having a stately, high, stone Steeple, with many pinakles, a stately stone Lantherne, standing upon foure stone Arches, builded by Robert de Rhodes. . . . It lifteth up a head of Majesty, as high above the rest as the Cypresse Tree above the low Shrubs." The most probable account of Robert Rhodes is, that he was an eminent lawyer and a most munificent benefactor of all the churches in Newcastle, who flourished in the reign of Henry VI.

Grey preserves the following enigma respecting this Church, which he ascribes to the celebrated Ben Johnson, the dramatic poet:—

"My Altitude high, my Body foure square,
My Foot in the Grave, my head in the Ayre,
My Eyes in my Sides, five Tongues in my Wombe,
Thirteen Heads upon my Body, four Images alone.
I can direct you Where the Winde doth stay,
And I tune God's Precepts thrice a day.
I am seen where I am not, I am heard where I is not,
Tell me now what I am, and see that you misse not."

The visitor will be glad to be furnished with Mr. Rickman's account of this church, which is as follows:—"The Church of St. Nicholas, at Newcastle, is a large and handsome church,

mostly of Decorated character, except the steeple, which is of later date. This church is a cross church, but has no tower at the intersection. The choir is inclosed for service, and is of a character rather different from the eastern parts. There are some fine windows left, but some have been inserted, others altered and modernized. The steeple is the most beautiful feature of the building, and is a most excellent composition, it is early Perpendicular, not much enriched, but producing a very fine effect. It is the type of which there are various imitations; the best known are St. Giles's, Edinburgh; the Church at Linlithgow; the College Tower at Aberdeen; and its modern imitation, by Sir C. Wren, at St. Dunstan's-in-the-East, London; but all these fall far short of the original. The tower is engaged, and opens to the nave and aisles by beautiful arches. The corners are bold buttresses, crowned by octagonal turrets, with pinnacles. From the base of these turrets spring four flying buttresses, on the intersection of which is placed an elegant lantern, crowned with a spire. The flying buttresses are crocketed, and are peculiarly graceful in their forms. This steeple is as fine a composition as any of its date, and the lightness and boldness of the upper part can hardly be exceeded. The church has some singular and curious portions, and the whole edifice deserves attention."

The inhabitants of Newcastle have always been proud of St. Nicholas' steeple. Bourne gives us an anecdote which shows how an adversary thought to avail himself of the circumstance. He says—"There is a traditional story of this building I am now treating of, which may not be improper to be here taken notice of. In the time of the Civil Wars, when the Scots had besieged the town for several weeks, and were still as far as at first from taking it, the General sent a messenger to the Mayor of the town, and demanded the keys and the delivering up of the town, or he would immediately demolish the steeple of St. Nicholas. The Mayor and Aldermen, upon hearing this, immediately ordered a certain number of the chiefest of the Scottish prisoners to be carried up to the top of the old tower, the place below the lantern,

and there confined. After this they returned the General an answer to this purpose, that they would upon no terms deliver up the town, but would to the last moment defend it; that the steeple of St. Nicholas was indeed a beautiful and magnificent piece of architecture, and one of the great ornaments of the town, but yet should be blown into atoms before ransomed at such a rate; that however, if it was to fall it should not fall alone; that at the same moment he destroyed the beautiful structure he should bathe his hands in the blood of his countrymen, who were placed there on purpose either to preserve it from ruin, or to die along with it. This message had the desired effect. The men were kept prisoners during the whole time of the siege, and not so much as one gun was fired against it."

Between the years 1784-87 extensive repairs and alterations were effected in the church. On this occasion the church was shorn of nearly all that was left of its ancient monuments(c). The old brasses and tombstones which were not claimed by the existing representatives of the families were sold by auction to the highest bidder. There is no account in the churchwardens' books of the money derived from this source!

The full height of the steeple is 193ft. 6in.; the length of the interior from east to west is 245 ft.; the full inside width at the transepts is 128 ft. 8 in.

There were, prior to Bourne's time, only five bells in St. Nicholas' steeple, but three others were added before the publication of his history, and one has been hung since, making nine in all. The first is dedicated to St. Nicholas, the second to the Virgin, and the third to St. Michael. All of these have corresponding inscriptions. The fourth is called the Common or Thief and Reiver bell, in consequence of its being used for the double purpose of summoning the burgesses together for public business, and of informing thieves and horse, cattle, and sheep stealers, on the eve of the annual fairs, that they are welcome to the town, and that

(c) Some of them had been destroyed in 1644 when the Scotch forces were in possession of the town.

no troublesome questions will be asked. This bell was recast in 1755. The fifth bell seems to have been cast in 1658: it bears the arms of Newcastle. Other three bells were added in 1717, but one of them appears to have been recast, for it bears the date of 1791. In 1833 a bell, bequeathed by Major Anderson, and denominated the "Major," was added to the peal. The clock strikes upon the "Major," which, though a big, is a bad bell. With reference to the other bells, what Bourne says of them is true—"They have a bold and noble sound, and yet an exceedingly sweet and harmonious one."

In 1832 the tower appeared to be inclining ominously to the south; in consequence of this the buttresses of the south porch were added. The north porch is another addition, which was effected in 1834.

The interior of the church impresses a spectator favourably. It is difficult, however, to view the large vacant space of the nave without wishing that it could be put to some useful purpose. The chancel and transepts are used for divine worship. On Sunday, 10th May, 1857, the persons attending the service were numbered on their entrance; in the morning they amounted to 1512, and in the evening to 1707. All of these were provided with seats.

The great east window was renewed three years ago. Grey gives this account of the former window: "In the church are many sumptuous windowes: and that in the east surpasseth all the rest in height, largeness and beauty, where the Twelve Apostles, Seven Deeds of Charity, &c., built by Roger de Thornton (a great benefactor of this Towne) with this inscription, *Orate pro animâ Rogeri de Thornton et pro animabus Filiorum et Filiarum.*" The window having become insecure it was thought better to replace it by a new one than to repair the old. It is filled with stained glass, by Wailes, in memory of Dr. Ions, who was for many years organist to the church. The fate of Roger Thornton's window shows us that a line in Grey, or Bourne, or Brand, is of more value, as a memorial, than all the windows in the world.

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There are four other memorial windows in the church, all of them by Wailes. Two of them are to Mr. James Dale, a successful merchant in Newcastle, and his children; another is to the late Mr. Garnett, a man of great benevolence, and whose charities were most unostentatious. Posterity will doubtless admire Mr. Garnett's window, but, to those who knew the good old man, the blending in it of the real and the ideal is not agreeable.

In the south transept, which is used as a chapel for prayers on Wednesday and Friday mornings, are three lights filled with stained glass, by John Gibson. Here also is a picture, by Tintoretto, presented by Sir Matthew White Ridley; the subject of it is, Christ washing the Disciples' feet.

The principal window in the north transept was restored a few years ago by Mr. Dobson, after the exact model of the original. Two smaller windows beside it, also of the Decorated style, are bending under the weight of years. It is refreshing to see some windows in the church of a style agreeing with its original construction.

Some of the monuments in the church will repay attention. Grey [1649] describes one, the loss of which we cannot but regret—"In the North part of the same is a Shrine of Henry, the fourth Percy Earl of Northumberland, who was killed by the hands of Rebels in Yorkeshire, gathering up a Subsidy; he was buried at Beverley, and this made in memory of him in his owne countrey, he having a house in this Toune and Parish." In Bourne's time [1736] the Earl's memorial had disappeared from "his owne countrey" and his "owne parish;" and no wonder, for he tells us—"When Mr. William Selby was buried, this monument was removed out of that corner, and Sir George Selby did set his magnificent Tomb there. After that it was placed against the Wall, near to Sir George's Tomb, and so continued 'till Mr. Lanc. Hodshon got leave of Vicar Nailor to remove it and place his Father. Where it is now I know not." This is very instructive.

In the south transept is a recumbent figure, cross-legged,

habited in a hauberk of chain mail, and surcoat, with a sword and shield ; at its feet is a lion. Brand thinks that it may be the effigies of Peter de Manley, a noble baron, who was a warden of the east marches. He died in the 6th of Richard II.

Next in point of antiquity is a monument in the south aisle of the chancel, erected to the memory of William Hall and his wife, by their son. He died in 1631. This monument is a favourable specimen of the debased style which came into vogue with the Stuart family. It is of marble, but has been so often coated with varnish that it resembles wainscot. There is another monument, in the Jacobean style, affixed to a pillar on the north side of the south aisle, erected to the memory of Lionell Maddison, who had been thrice Mayor of Newcastle, and some members of his family. Of the other monuments a very slight notice must suffice.

There is one by Bacon to Matthew Ridley, Esq., of Blagdon, a citizen of great usefulness and high renown. He was Mayor of Newcastle in 1745, when the Pretender meditated an attack upon the town. To this circumstance reference is made in a medallion at the base of the monument :—Newcastle, represented by a female, bearing a mural crown, flies to him for safety : he covers her with his shield, while with a sword in his right he resists rebellion, also personified by a female.

A tablet in the south transept bears a simple and unostentatious inscription to "Mr. William Scott, Freeman and Hoastman of this town," father of Lords Stowell and Eldon, from the pen of the latter. It was erected here in consequence of mural monuments being prohibited in All Saints' Church, where Mr. Scott was buried.

Here, too, is a monument by Flaxman, erected to the memory of the Rev. Hugh Moises, A.M., by his pupils. The inscription is from the classic pen of his distinguished pupil, Lord Stowell.

In the nave is a monument, by Flaxman, to Sir Matthew White Ridley, the grandfather of the present baronet. The concluding lines of the inscription are strictly true—"He

lived respected and beloved, He died universally lamented." The figure of the deceased, wrapped in a Roman toga, has an attitude of grace and dignity: the sandals, nearly on a level with the eye of the spectator, have an odd effect. The bust of Collingwood, on the other side of the door, will be viewed by every Englishman with emotion. The words 1ST JUNE—ST. VINCENT—TRAFALGAR, inclosed in wreaths of oak leaves, are a sufficient memorial: the forty-two lines of inscription which follow will be read by few.

The monument to Robert Hopper Williamson, Esq., a former Recorder, is not a remarkable one. He was, however, a remarkable man, and was a great blessing to the district. His opinions as a lawyer had all the force of decisions, and in this way much litigation was prevented.

Before leaving this church some may be interested in knowing that John Knox preached in it for nearly two years, being commissioned to do so by the Government of Edward VI. His zeal stirred up the enemies of the Reformation, and he was summoned to appear on the 4th of April, 1550, "to gif his confessioun why he affirmed the Masse idolatrie, in presence of the Consale and Congregation, the Bischope of Dureham, and his doctours." The meeting, it is believed, took place in the nave of this church. Knox, nothing daunted by the presence of Tunstall, boldly maintained the truth of the proposition that was laid to his charge. His enemies were for the time silenced.

This church has long been in possession of a small library, to which the inhabitants of the town have access. In the year 1736, Dr. Thomlinson having bequeathed his books to the number of 1600 to this town, Sir Walter Blackett erected the incongruous edifice which stands on the south side of the church, for the better accommodation of the collections. The vestry is on the ground floor; the old library and Dr. Thomlinson's library occupy the upper storeys. Amongst the books in the old library are a copy of Walton's Polyglott, and some valuable editions of the Fathers. The chains by which these books were fastened to the reading shelves are preserved: they have portions of

the boards adhering to them. Little use has for many years been made of these libraries, and unless they are committed to the care of some public institution, whose arrangements admit of free access being had to them at all reasonable hours, the only purpose they are ever likely to subserve is the breeding of successive generations of most unmetaphorical book-worms. In the old library, Brand tells us, is a very curious MS. copy of the Bible, with many beautiful illuminations, which appears to have belonged to the Church of Hexham. He (writing in 1789) thought that it could not be less than 600 years old. It is still there. There are some other MSS., dating, it is supposed, from the time of William Rufus, and even anterior to it.

All Saints' Church.—The present church is a modern one. Bourne, speaking of the former church, which he calls All-hallows, says—"Who it was founded by, I have met with no account, nor any of the time it was built in; only this is certain, it must have been built before the year 1286, but how long before I know not." The old church, though a spacious one, and capable of holding 2000 persons, does not seem to have had any pretensions to architectural beauty. Owing to its insecure state, it was resolved in 1786 to erect a new building. The consecration of the present church took place Nov. 17th, 1789. Mr. David Stephenson was the architect: the style of it is Grecian. The spire was not completed until Oct. 21, 1796: it has an elevation from the ground of 202 feet. The principal entrance is from the south, by steps and a Doric portico, to the vestibule, which is 24 feet 10 inches in diameter; east of which is a capacious vestry, and to the west a small chapel. The main body of the church forms an ellipse, the diameter being 86 feet by 72 feet, exclusive of a semicircular recess in the east wall, which contains the pulpit, and another in the west wall, which contains the gallery stairs and the organ. The eye is somewhat confused by the varieties of curve. The pews are made of solid mahogany, and the church is seated to accommodate 1173 persons, besides 217 children. It cost

£27,000. Many of the details of this church are good, but the general effect is not happy. It may be questioned whether a spire to a Grecian church is not antagonistic to its general design, the great object of which is to secure breadth.

There are three painted windows behind the pulpit to the memory of Jos. Garnett, who died 14th Dec., 1861, aged 90 years. There are two other painted windows, representing the Apostles Peter and Paul. All these windows are by Wailes.

The only relic of antiquity in this church, and it is one of great interest, is the monumental brass which covered the altar tomb of Roger Thornton and his wife. The carving is elaborate and masterly. Besides the chief figures are small images of the apostles and saints, and the family arms. Round the rim of the plate runs the inscription—"Hic jacet Domicella Agnes quondam uxor Rogeri Thornton que obiit in vigilia Sancte Katerine anno Domini m.ccccx. Propitietur Deus amen. Hic jacet Rogerus Thornton mercator Nobi Castri super Tinam qui obiit anno Domini. m.ccccxix, et iii die Januarii." This brass plate is preserved in the vestry.

St. Andrew's Church.—Bourne says—"Nigh to Newgate, on the west side of the street, is St. Andrew's Church. This is questionless the oldest church of this town; not only from its situation, which is that part where was principally the ancient Monkchester, but also from the model and fashion of its building, it appearing in these things older than the others."

The whole building has a venerable aspect. In addition to the decrepitude of age, it bends under the injuries it suffered during the siege of 1644. Its tower, solid and Norman-like, has, in order to prevent its fall, been strengthened by several boldly projecting buttresses. The windows of the chancel indicate an advanced period of the Early-English style. The brick vestry, whose dead wall fronts the street, was built in 1788. It is exceedingly useful as

indicating the precise period when architectural taste reached the lowest point of depression in Newcastle. The south transept is a recent restoration in the Norman style, by Mr. Dobson. It scarcely harmonises with the rest of the building. The chief feature of the interior is the Norman chancel arch, with its characteristic zigzag moulding. The circular columns of the nave indicate a period not long subsequent to that of the Norman. By the side of the communion table is a picture of the Last Supper, by Giordano, which was presented by Major Anderson in 1804. There is some stained glass in the south transept, that in the end window is by John Gibson, the rest is by Wailes. The church is a comfortable one, and is capable, with a little arrangement, of seating about 1500 hearers.

St. John's Church is known to have been erected prior to 1287. In the recent repairs some portions of Norman work have been found. It presents no features of peculiar interest. The chancel was rebuilt in 1848. The church is calculated to seat 1100 persons. The east window and the three south windows of the chancel are filled with stained glass, by Wailes.

MONASTIC INSTITUTIONS & HOSPITALS.

I. *The Nunnery of St. Bartholomew*.—This house of Benedictine Nuns was undoubtedly the earliest conventual establishment in Newcastle. Brand states, on the authority of the Scottish chronicler Fordun, that it was in existence as early as A.D. 1086, in which year Agatha the mother, and Christina the sister of Edgar Atheling took the veil in Newcastle; but in this he is not borne out by his author. Under this date Fordun relates the fact, known to us from the Saxon Chronicle and other sources, that Christina became a nun at Romsey, in Hampshire, and then proceeds to offer a

different statement, which he had met with in another writer, that "Agatha the mother and Christina the sister of St. Margaret were espoused and consecrated to Christ at Newcastle-upon-Tyne," but he does not connect this latter statement with the year 1086, or with any specific date. We find the same story in the *Scala-Chronica*, but here the profession of the two royal ladies is distinctly referred to a period subsequent to the death of Malcolm King of Scotland, which did not take place till the close of 1093, in the 7th year of William Rufus, when it is quite possible the nunnery may have been established; whereas, in 1086, the town itself was not founded. At all events, this house must have been established previous to the reign of Stephen, during which the northern counties were in the hands of the royal family of Scotland, and King David occurs as a benefactor. His benefactions, however, reverted to the Crown in the reign of Henry II., but the nunnery continued to exist, which it would not have done, if David had been the original founder, as some writers have alleged. Speed assigns the foundation to Henry I.; but more reliance is to be placed on Dodsworth, in whose collections, drawn from original records, which for the most part are no longer extant, we find a memorandum that the founder was one of the ancient barons of Hylton.

Henry II. having resumed the lands granted by King David, confirmed to the nuns their other possessions, including their own Church of St. Bartholomew, and the ancient site of the Hospital of St. Mary. From this period to the Reformation they received numerous benefactions, and their annual rent-roll at the dissolution amounted to £36 11s. 2d., arising from property in Newcastle, Northumberland, and Durham. After the suppression of the lesser monasteries, this nunnery was refounded by letters patent, bearing date January 30th, 28 Henry VIII., but afterwards surrendered January 3, 1540. The establishment then consisted of the prioress, Dame Agnes Lawson, and nine other inmates.

The nunnery was approached from Newgate Street by a

narrow passage, which still retains the name of Nuns Gate, and communicates with a street of recent formation, appropriately called Nuns Street. A portion of the gateway "very lately remained," when Brand wrote his History of Newcastle in 1789. Bourne supposed this to have been only a back entrance; but Brand, with greater probability, considered it the grand entrance, "the gateway being very unlike that of a back passage, especially when we consider the general poverty of style in building that prevailed at the time when this was erected."

Of the Nunnery itself no traces remained, but amongst Fairfax's views, published about the middle of the seventeenth century, is a small one of its remains, inscribed "the Nunns, Newcastle," which is reproduced by Brand. The same historian is of opinion that an old foundation, on which the Theatre erected by Mr. Parker, behind the Turk's Head Inn, was partially built, had formed part of the north wall of St. Bartholomew's Church. This Theatre, afterwards known as the Turk's Head Long-room, was pulled down about thirty years since, to obtain an opening to connect Grainger Street, which was then in course of erection, with Newgate Street.

The house and grounds of the Nunnery were granted in the 36th of Henry VIII., to William Barrantyne and others, and were afterwards the property of Lady Gaveere, who sold them to Robert Anderson. This gentleman, finding the buildings tenanted by Scots, and other non-freemen of doubtful reputation, caused them to be pulled down, and having levelled the dene which intersected the garden, converted the whole into a meadow. This was at a later period the property of the Blackett family, who were also the possessors of the site of the adjacent house of Gray Friars. Both properties were sold after the death of Sir Walter Blackett, in 1783, to Mr. George Anderson, by whose son, Major Anderson, they were bequeathed to his relative, Thomas Anderson, Esq., now of Little Harle Tower, and by him sold to the late Mr. Richard Grainger.

II. *The Hospital of St. Mary the Virgin* is next in

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antiquity, amongst the religious houses in Newcastle, to the Nunnery of St. Bartholomew, having certainly been founded before the close of the reign of Henry I. To this establishment, as well as to the nunnery, David King of Scotland was a benefactor, and his grants to the hospital were in like manner resumed by Henry II. The abstraction of this portion of their property seems to have left them in a very impoverished state, for we find them abandoning the site of their house to the nuns, and removing to a new home, provided for them by the liberality of Aselac of Killinghow, who is correctly styled, by Bourne, their second founder.

This charter sets forth that he has founded the Hospital and Chapel of St. Mary the Virgin upon his own land in Newcastle, and has placed therein two brothers, regulars, and one chaplain to serve God and the poor. The original structure must, no doubt, have been contiguous to the house of the nuns to whom it was afterwards granted; the second foundation was in Westgate.

Henry II., by his charter, granted and confirmed in general terms "to God and the Church of St. Mary, and the Hospital of Newcastle, and the Brethren there serving God, all such lands and tenures as have been reasonably (*rationabiliter*) given to them, or as by God's help they shall hereafter be able to obtain."

When the town walls of Newcastle were built, they were carried through the premises of the hospital, leaving the greater part of their buildings on the outside. To obviate, as far as possible, this inconvenience, the brethren had a patent, bearing date A.D. 1290, authorizing the construction of a postern gate of communication through the said wall. From this gate the street, now called the Postern, leading therefrom, derives its name.

This hospital seems to have escaped, through inadvertence, the operation of the statute of the 31st of Henry VIII. for the dissolution of Abbeys, Priories, Colleges, and Hospitals, the Corporation of Newcastle continuing to present to it, as if no such Act had passed. In 1611 it was

formally refounded by James I. for the maintenance of a master and six poor brethren.

From the 42nd of Elizabeth, when a new governing charter was granted to the town of Newcastle, to the passing of the Corporation Reform Act, the annual elections of Mayors and other corporate officers were held in the chapel of this house. This building was also devoted to the purposes of a free Grammar School about the same period, the same party in many instances, though not invariably, filling the offices of Master of the Hospital and of the Grammar School. George Stephenson's monument stands near the site of it.

There were some fine features in the building, but its general appearance was unseemly and greatly dilapidated. The east window was of large dimensions and graceful proportions, but in a state of decay, having been for many years built up and concealed from view. The side aisles were gone, and the arches which communicated with them walled up. The whole was removed in the spring of 1844. The question of restoration or destruction was rather warmly agitated at the time, but the latter was determined on, partly on economical grounds and partly from want of space to restore the chapel in its old proportions.

The houses of the head master and ushers were pulled down some time previously. They had been built out of the materials of the hospital, and comprised some portion of the original structure. There is a good view of the chapel and adjacent buildings, with the garden belonging to the head master's house, in Brand's Newcastle. The dignified figure engaged in watering a plant represents the Rev. Hugh Moises, under whose superintendence, from the middle until near the close of the last century, the school attained its highest distinction.

III. *The Hospital of St. Mary Magdalene*, at the Barras Bridge, is said to have been founded by Henry I., but no evidence is extant of its existence at so remote a period; the earliest document relating to it being a bull of confirmation

from Pope Alexander IV., who occupied the papal chair from 1254 to 1261. A license of mortmain was granted by Edward I. in 1291 to enable the master and brethren to hold a house which had been bequeathed to them by John de Hercelaw. The object of the institution was to afford a refuge for persons affected with leprosy, and the foundation is said to have included sisters as well as brethren to attend on patients so afflicted.

Roger Thornton the elder, by his will dated in 1429, left two pounds to the "lepremen" of Newcastle.

In the Report on Colleges and Charities in Northumberland and Durham in the 37th of Henry VIII., it is stated that since "that kind of sickness (leprosy) is abated, the house is used for the comfort and help of the poor folks of the town that chanceth to fall sick in time of pestilence." Its revenues are valued at £9 18s. Notwithstanding the statute of dissolution, the hospital continued to exist till the reign of James I., who granted a new charter, by which the chapel on the Tyne Bridge was incorporated with it. Since that period, the charity has consisted of a master and three brethren, the latter, necessarily burgesses of the town. The master continued to do duty in the Chapel of St. Thomas the Martyr, at the end of Tyne Bridge, until that structure was pulled down, and a new church built in lieu of it on the property of the hospital at the head of Northumberland Street, in 1830, under the powers of an Act of Parliament. The old hospital stood near the same site, but had not for many years been inhabited by the brethren. A view of it is preserved in Richardson's *Etchings of Antiquities in Newcastle*, where will also be found views of St. Thomas' Chapel, at the Bridge End, and of the vaults under the chapel. A portion of the vaults still remain, and are used as an iron-warehouse.

IV. *The House of the Dominican, or Black Friars*, of which the remains are much more considerable than of any other religious establishment in Newcastle, is situated behind Charlotte Square, a little to the north of Westgate Street.

The precise date of its foundation is unknown, but the Friars Preachers resident here occur in a document on the patent roll of the 48th of Henry III., A.D. 1264, from which period we have frequent notices of them.



The House of the Dominican, or Black Friars.

The house was surrendered to the Crown on the 12th of June, 1539, when its annual revenue was found to be £2 19s. 4d.

In a return preserved amongst the late Chapter-House Records of the "Houses of Friars lately given up, which

have any substance of lead," I find the following memorandum. "The Black Friars in Newcastle—the quire and all the cloister lead, ready to fall;" of the cloister there are no traces, but the church still remains, forming with the apartments formerly occupied by the Friars, three sides of a quadrangle. The building owes its preservation to its having



Part of the Quadrangle of the Black Friars.

come by grant from the Crown to the Corporation of Newcastle, who leased it to nine of the Incorporated Companies, known as the "nine mysteries," for the purpose of holding

their annual and other meetings. The church forms the meeting-house of the Smiths' Company. This edifice possesses an historical interest, as the scene of the homage performed by Edward Baliol to Edward III. for the crown of Scotland.

At the time of the lease to the Incorporated Companies in 1552, the house was surrounded by gardens and orchards; and as late as 1824, a considerable portion of this ground remained open, which is now occupied by Stowell Street, and other recent erections.

Both externally and internally the integrity of the ancient building has been violated by architectural innovations and incongruities. Amongst other dilapidations, we have to lament the destruction of the fine west window of the church, but a visit will still repay the trouble of a lover of antiquity.

The adjoining street now known as Low-Friar Street, was anciently called "Shod-Friar Chare," to distinguish it from High-Friar Street, which passes the house of the Grey Friars, who went barefooted.

The founders of this house are said to have been Sir Peter and Sir Nicholas Scot, father and son, merchants, and mayors of Newcastle, 1251 and 1269.

The surrender was signed by the Prior, Rowland Hardyng, and twelve brethren, of whom nine were priests.

V. *The Grey Friars, or Minors*, called also Franciscan Friars, had a house on the west side of Pilgrim Street, at its northern extremity. It is said to have been founded by the Carlols, wealthy merchants in Newcastle, in the reign of Henry III. Bourne says the establishment existed in 1267.

The celebrated Duns Scotus was a member of this house, a man, says Fuller, "of such *nimble* and solid parts that he got the title of Doctor Subtilis." He had generally been considered to have been by birth a Scotchman, but Leland, and after him Fuller, show by writings under his own hand at Merton College, Oxford, where he studied, that he was a native of Dunston, in Northumberland, in the parish of

Embleton, the impropriation of which belongs to that college. Scotus seems to have been taken to denote his country, whereas it was a very common surname in Northumberland at this period.

In 1539 the Friars Minors of Newcastle surrendered their house. The document bears the signatures of John Craforht, guardian; John Hesselden, priest; Wm. Mawer, priest and sub-guardian; six other priests, and two novices.

The premises were granted, in 1544, to the Earl of Essex and others, and were afterwards the property of Robert Anderson, who has been already mentioned as the purchaser of the site of the Nunnery of St. Bartholomew. About 1580 he built the magnificent mansion in Pilgrim Street, afterwards known as Anderson Place, out of the materials of the Friary. The two wings were added by the first Sir William Blackett, of the Wallington branch of the family.

Not a vestige of the Friary remains. The New Markets nearly represent its site.

VI. *The White Friars, or Carmelites*, were first established in the reign of Henry III. on the Wall Knoll, within the precincts of Pandon, which was not yet included in Newcastle, but formed part of the manor of Byker. In 1307 they removed, under a charter from Edward I., to the foot of Westgate. This site was originally occupied by a society of Friars of the Sac, or of the penance of Jesus Christ, which had at this time dwindled to a single member. The surrender of the White Friars bears date January 10th, 1539, and is signed by Gerald Spor, prior, seven priests, and two novices. The income amounted to £9 11s. 4d.

The site was granted to Sir Richard Gresham and Richard Billingford, and was afterwards the property of Dr. Jennison, Vicar of Newcastle, in the time of the Commonwealth. It was purchased by Dr. Adam Askew, afterwards of Redheugh, previous to 1740, in which year he erected a mansion house on the ground, "in the kitchen of which," says Brand, "some vestiges of the windows, &c., of the Priory still remain." Within the memory of a person then living,

he adds, all the ground between the Close and the Postern was laid out in gardens, the property of Mrs. Jennison, in the midst of which stood considerable remains of the White Friars, which were occupied as a gardener's house.

VII. *The House of the Austin Friars* was founded by William de Ros, Lord of the Barony of Wark, about A.D. 1290, and was situated in what is now called the Manors, to the east of the Royal Arcade. It was a house of some pretensions. Here Margaret, daughter of Henry VII., was entertained on her route to Scotland, previous to her marriage, and after the dissolution it was retained for the use of the King, for his council of the north to reside in. In Speed's Map of Newcastle, in 1610, it is described as the King's Manor, whence the modern appellation of the Manors. The date of the surrender is January 9th, 30th of Henry VIII. It bears the signature of Andrew Kell, prior, eight priests, and three novices.

In 1648 the Manors was in the possession of the Corporation of Newcastle, who granted a site for the hall of the Barber-Chirurgeons. The remainder has from time to time been applied to various public purposes. Upon it were erected the Hospital of the Holy Jesus, also Blackett's and Davison's Hospitals. "The present workhouse or general hospital," says Brand, "out of which the old windows were taken about fifty years ago, has formed, it would seem, one of the quadrangles of the convent. In what is called now the cellar of that building, two ancient arches still remain over the doorways, near the hall or common eating-room."

VIII. *The House of Trinitarian or Maturine Friars*, dedicated to St. Michael, and called, from its lofty situation, St. Michael's on the Mount, was founded on the site at the Wall Knoll vacated by the Carmelites, who had license to alienate the ground to William de Acton, burgess of Newcastle, for the purpose of this foundation, in 1361. The brethren were required to keep three spare beds for the exercise of hospitality to casual visitors. The surrender is

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dated January 10th, 1539, and is signed by the master only, Thomas Wayde. The site was granted to Sir Richard Gresham and Richard Billingford, gent., who, in 1548, conveyed it to William Dent.

In 1552, it was conveyed by William Dent, alderman of Newcastle, and William, his son and heir, to parties in trust for the Corporation, whose property it still is.

The building is marked as standing in Speed's plan, in 1610. Bourne speaks of the east end of the church as still standing, and Brand mentions vestiges of old buildings, gateways, &c.

Besides these religious houses within the town, the Hospital of St. Mary, at Jesmond, stood at the distance of about a mile. There are some remains of the hospital, and the chapel is a pretty ruin.



OLD NEWCASTLE.

Many times has the besom of destruction swept over Newcastle. Sometimes in the name of improvement, sometimes in the form of calamity, but most frequently from a love of change, that which our fathers have reared has been removed to make way for our own handiworks. Newcastle, though boasting of its antiquity, is after all only *Newcastle* still.

This section will consist of an attempt to point out some ripple marks on the shore, caused by the flowings of time.

Credible witnesses assert that they have seen some Roman building in the cellar of the house No. 7, Collingwood Street. Recent arrangements have for the present quite concealed it. The visitor who wishes to see some traces of the Roman era *in situ* must go to the outskirts of the town; on the east side, he will see the ditch of the Wall stretching from Byker to Wallsend; and on the west (immediately after passing the last row of houses in the town, Oxford Road) he will meet with the fosse of the Wall, and all the works of the vallum. At East Denton (3 miles) he will see a piece of

the Wall standing three or four courses high ; and if he go a little further he will observe, opposite Denton Hall, not only a long stretch of the Wall (covered with turf) on the south margin of the road, but at the bottom of the field, he will see all the features of the vallum distinctly developed. (*Wallet Book of the Wall.*)

Of Saxon Newcastle, there is not a shred left.

The castle, the churches, the walls, and the gates already described are interesting memorials of the Norman and the Plantagenet period.

Several buildings belonging to the times of the Tudors and Stuarts, which have not yet been mentioned are left to us ; these may be attended to, and other fragments gathered up, as we take a ramble, with this object in view, through the town.

Percy Street forms the northern entrance into the town. It was anciently called Sidgate. There are some low cottages on the west side of the street which give us an idea of the kind of houses which were built outside the walls of a border town. In one of these low houses, No. 96, now used as a rag shop, Dr. Charles Hutton, the mathematician, was born. The little education that he got at school was received in a house (now removed) at the corner of Percy Street and Gallowgate. The venerable dame who taught him to read was not a good scholar herself ; whenever her pupils came to a hard word she would say "Skip it, it's Latin." Between the foot of Albion Street and Gallowgate, are some old houses of the style called Tudor.

New Gate, which guarded the entrance into the town from the north, and stood between Percy Street and Newgate Street, was a grand old pile. Besides the tower, a barbican or advanced work defended the gateway. When taken down, its portcullis, which was found entire, was taken to Blagdon, where it doubtless remains. In front of the barbican were the arms of the United Kingdom, and a figure of James I., placed there after the union of the kingdoms. Both of these are now in the Old Castle. It used to be said that the statue, on hearing the clock strike twelve,

descended from its niche. There are those yet living who, in their innocent boyhood, have hurried to the gaol on the approach of noon, to ascertain the truth of the statement. The writer has a clever sketch of this gateway tower. The painter, wishing to throw a little life into the scene, has introduced an execution about to start for the fatal tree at Gallows-hole. The cart, bearing a coffin, is at the door, and the sheriff waits for the criminal to take his seat upon it.

Prior to the year 1824, the site of Blackett Street, which extends from the north end of Newgate Street to the north end of Pilgrim Street, was chiefly occupied with the remains of the town wall and its fosse. It was not kept in an orderly state.

Proceeding down Newgate Street to the point where Low Friar Street branches off from it, we are at a locality called the White Cross. The cross is mentioned as early as 1410. A little market shed, with a neat spire and clock, stood here so late as 1807; the clock was exceedingly useful. There is room for a market cross here still, no public clock is near, and the locality much requires some architectural adornment. Several markets were formerly held at the White Cross. There is still a market for milch cows every Saturday, and three annual fairs are held in this street—which overflow into all the contiguous streets—two for horses, and one for black cattle.

Turning into Low Friar Street, we are soon at the Friars. Although the district is not an inviting one, the venerable aspect of the place has an inspiring effect upon the mind. The history of the Dominican fraternity has been already given. The principal buildings of the monastery came, shortly after the dissolution, into the hands of several of the ancient mysteries or crafts, who, having occupied them as places of meeting, they have thus been preserved from entire destruction. The buildings are arranged in the form of a square: against the inner sides of them the cloisters were probably reared. The chapel of the monastery exists, and is in the possession of the Smiths' Company. It has been sadly changed, and is now in a most wretched state of dis-

repair ; but enough is left to show its original purpose. The woodcut, page 45, shows the chapel on the right of the buttress ; the door-way seen in the angle of the woodcut, page 46, leads into the chapel. It was in this building that, on the 19th June, 1334, Edward Baliol, King of Scotland, did homage (as already mentioned) to King Edward III. for the kingdom of Scotland. The ceremony is said to have been very splendid and imposing. A well that is now dry, in consequence of the drainage of the town, is hard by, and is known as the Lady's Well.

The dwelling houses of the ancient town were peculiar. They were chiefly constructed of timber, the interstices between the beams being filled up with brick, or covered with lath and plaster. As space within the walls was very



The Side, opposite the Butcher Bank.

valuable, the most was made of it, and usually each storey

of a house projected into the street beyond the one below. Dormer windows and gable ends appeared in the roof. Of these houses there are many examples in the town. They are exceedingly picturesque. In our modern houses the front elevation is usually flat, and the lines of the roof uniformly straight; in the old houses the surface was continually varied, and wavy shadows brought out their forms in bold relief.

It is remarkable that previous to the time when Mr. Grainger began his operations, no private house in Newcastle, with three exceptions, was fronted with ashlar stone (Oliver's Guide, p. 11). Although the immediate vicinity abounds in excellent freestone the inhabitants found it easier to resort to the neighbouring woods and fell a tree. Bourne tells us "that the Town Moor was originally a wood, very famous for oak trees, out of which have been built many hundred of ships, and all the houses of the old town of Newcastle." The town stands upon a bed of thick clay, so that the inducement to make bricks, when timber failed, rather than to quarry stone, was considerable. There are, however, three old houses in the town built of stone. One of them is in Low Friar Street, and is traditionally said to be the oldest house in the town. The history of it is not known, but judging from its ornate character, it must have belonged to a person of importance. Sporting dolphins and winged heads are carved upon it. The window frames are tastefully ornamented. In the recollection of some now living, Low Friar Street was what is called a respectable street, several of its houses being occupied by persons of distinction in the town. The other two stone houses of old date are in Westgate Street, one of them at this moment (June, 1863) undergoing the process of being chipped all over, the other, and the older one, has been coated with cement. The grinning figures at the angular summit of the gables will be noticed.

Returning to the White Cross and going down Newgate Street we come to a public water reservoir, called the Black Horse Pant. The word pant seems to be peculiar to the north country, and is supposed to be allied to the word *pond*.

Until a comparatively recent period the great proportion of the inhabitants of Newcastle were dependent for their daily supply of water upon the public pants. This pant derived its peculiar designation from an inn bearing the sign of the Black Horse, which stood on the west side of Newgate Street, on ground that is now occupied by Clayton Street. The Black Horse, at the beginning of the last century, was the principal inn in the town, and it was here that the grand jury dinners were held in the assize week. Here it was that the quarrel arose which led to the murder of Mr. Forster, the member for Northumberland, by Mr. Fenwick, of Rock. He was tried and convicted for the offence at the same assizes. There is something terrible in the thought of a gentleman being summoned to do honour to the ministers of justice on their entrance into the town, and to assist them in the discharge of their duties, being himself placed in the dock, and, as the result of the whole, dying by the hands of the common hangman. The singing of the famous Northumberland air "Sir John Fenwick's the flower among them" seems to have led to the altercation which ended so fatally. The execution took place near the scene of the murder—according to one account, on a tree that grew on the opposite side of the street. At the time it took place the gates of the town were shut to prevent the possibility of a rescue. This occurred in the year 1701.

On the left hand side of the street, lower down, is a modern Gothic building; it marks the position of the great gateway leading into the precincts of the Nunnery of St. Bartholomew. On the opposite side of the street, and for some distance downwards, are several inns, which, though all of them mangled and modernised, bear some of the features of the ancient hostel—they are the Scotch Arms, the Fighting Cocks, the Unicorn, the Golden Lion, &c.

We now approach a huge pile of building of modern erection, which greatly impedes the traffic of the street, and almost wholly obscures the view of St. Nicholas. On the site of it there formerly stood two rows of timbered and gable-ended houses. They were low, and, perhaps, according to our modern notions, inconvenient, but they were

highly picturesque. The wood-cut represents the last of them which have very recently been removed. The left hand house is the one in which Cunningham, the pastoral poet, lived and died. Three narrow streets, instead of



Old Houses formerly in front of the Town Hall Buildings.

two only as at present, then accommodated the traffic between Newgate Street and the lower parts of the town. Here, in ancient times, most of the markets were held, as the names of the streets indicate. The lower part of Newgate Street is still called the Bigg Market. Bigg, or bear, is a hardy kind of barley which has four rows of grain on each ear. It has quite gone out of cultivation in the North of England, and is but rarely met with now even in Scotland. The street on the right hand was called, as it still is, the Groat Market; the street on the left hand was called the Flesh Market (*d*). Here the butchers used, on a Friday night, to erect their shambles; the market was held next day.

(*d*) Mackenzie objects to the attempt to change the name to Butcher market; it, as he says, "having for ages been used for the sale of *flesh* and not of *butchers*."

The lower part of the Flesh Market was frequently called the Cloth Market. Here, at the two annual fairs, the booths for the sale of blankets and woollen cloths used to be erected. The street between the Flesh Market and the Groat Market, which is now blocked up by the Town Hall Buildings, was called the Middle Street. More anciently, the upper part of it was called Skinnergate, and the lower parts Spurriergate and Saddlergate, no doubt in consequence of the residence of the dealers and workers in leather. The wool market was held in a vacant space between the Middle Street and the Groat Market. At present, in the Bigg Market and contiguous parts, a market for provisions is held on the mornings of Thursday and Saturday. The market is chiefly of a wholesale character, and the business done, particularly on a Thursday morning, is considerable. The articles sold are butter, bacon, eggs, and poultry. They are brought in by the carriers' carts, which arrive from all parts of the surrounding country on the mornings of these days, and return in the afternoon to their several destinations, laden with groceries and other goods purchased in the town. Large quantities of eggs are introduced from Ireland, and also from Scotland and France. Besides this market, there is a still more important one for bacon and ham, held on the Sandhill every Thursday morning. This is entirely of a wholesale character, and the goods are brought to town by railway. On the morning of writing this (Aug. 6th), about 4000 stones of bacon and ham were disposed of, and this is not considered an unusual quantity.

We return again to the vicinity of the Bigg Market. In front of St. Nicholas' Church was the market for iron. There was a market for poultry near at hand, in the High Bridge: there are still some remains of the piazza in which it was held.

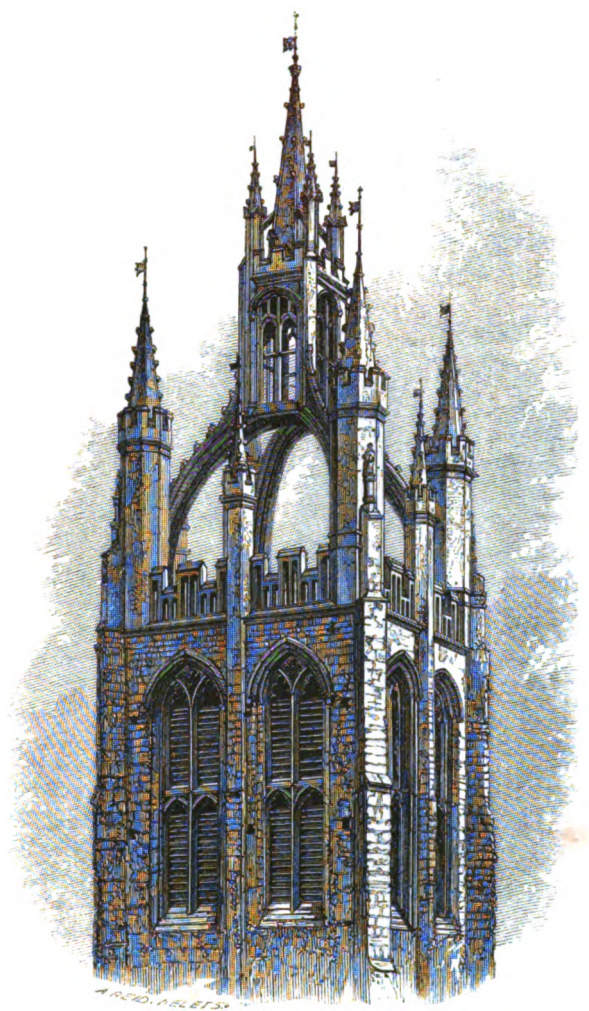
A street on the right hand leads from the Bigg Market to Westgate Street. It is chiefly remarkable on account of its name—the Pudding Chare. The word *chare*, though occasionally to be met with in other parts of the North of England, is almost peculiar to Newcastle. It signifies a

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narrow street or alley. Its origin has not been satisfactorily accounted for. Brockett derives it from the "Saxon *cyrran*, to turn; a chare being a turning from some superior street." The word Pudding is not without its difficulties. Bourne says, he has "seen it in some ancient writings *Budding Chare*." This is probably a clerical error. May not the venders of black puddings have had their stalls in this chare, for the convenience of the market people? Before the destruction of the last "new markets," to make way for Mr. Grainger's improvements, the dealers in this article sat at the entrance into them, and importuned each passer by to purchase. Many persons from the country, pitmen especially, made a comfortable dinner off a penny roll and a black pudding. The following extract is from Brockett's Glossary:—"Black *pudden*, a pudding made of blood, suet [oatmeal], &c., stuffed into the intestines of a pig or sheep. I take notice of this word because this savoury and piquant delicacy is a standing dish among the common people in the north; and it affords me an opportunity of rescuing from oblivion the peculiar cries of the present venders of this *boudin ordinaire*. 'A nice black pudden, man!' 'A nice het pudden, hinnie!' 'A nice fat pudden, smoken het, maw jewel!'" These cries have nearly ceased; we did not know the value of them while we had them.

We are now arrived at a vacant space in front of St. Nicholas' Church. Who can behold its magnificent spire without admiration? Collingwood Street stretches to the right of us, and Mosley Street to the left. It is necessary here to describe the condition of the central part of the town prior to the year 1788.

A stream called the Lorke Bourn, fed, probably, by the surface water of the Leazes, flowed through the Nuns Field and down what is now Dean Street to the Side. It joined the Tyne to the east of the present fish market. It was quite open, and its banks are described as being very steep and dangerous. There were two bridges across it—one called the Upper Dean Bridge or High Bridge, the other the Nether Dean or Low Bridge. The High Bridge gave name to the street which runs from the Cloth Market across Grey



Steeple of St. Nicholas.

Street to Pilgrim Street. Some remains of this bridge are still to be seen in the sewer of Grey Street, to which, doubtless, the obliging Town Surveyor will be glad to introduce any curious stranger.

The other bridge crossed the dean in a line immediately opposite the east window of St. Nicholas' Church. Stairs lead from the level of the present street to that of the churchyard. Here we get the pretty peep of the church shown in the woodcut. The stairs and street on the opposite side of Dean Street take the name of the Low Bridge.

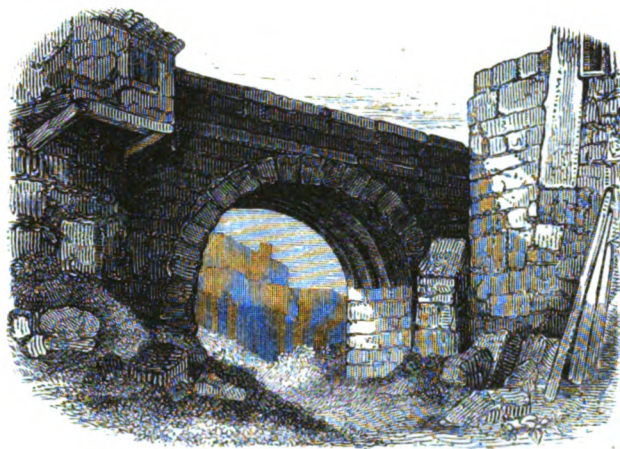
The bridge itself is now entirely removed. The woodcut (see next page) represents it as it appeared before its destruction. Bourne tells us that "formerly, when the merchants had their shops and warehouses in the Flesh Market, the river ebbed and flowed above this bridge, and the boats came under it with the wares and commodities of the merchants." We can only understand this by supposing that the gully of the burn was greatly depressed below the level of the present Dean Street. The alley below the Low Bridge is called the Painter Heugh. It is seen near the arch in the woodcut (page 62). It is said to have got this name from *painter*, a rope by which boats are moored, and *heugh*, a steep hill side. Mr. Wardle, architect, of this town, has told the writer



St. Nicholas from Dean Street.

that in examining, some years ago, a cellar, at the corner of Painter Heugh and Dean Street, he noticed what he took to be the remains of a quay. An iron ring was inserted in the masonry, and the masonry in the vicinity of the ring was marked as if by the action of boat hooks.

The extreme inconvenience of having the town divided into two sections by an inconsiderable brook may readily be conceived. To make matters worse its waters were not always as pellucid as could be desired. Mackenzie bluntly



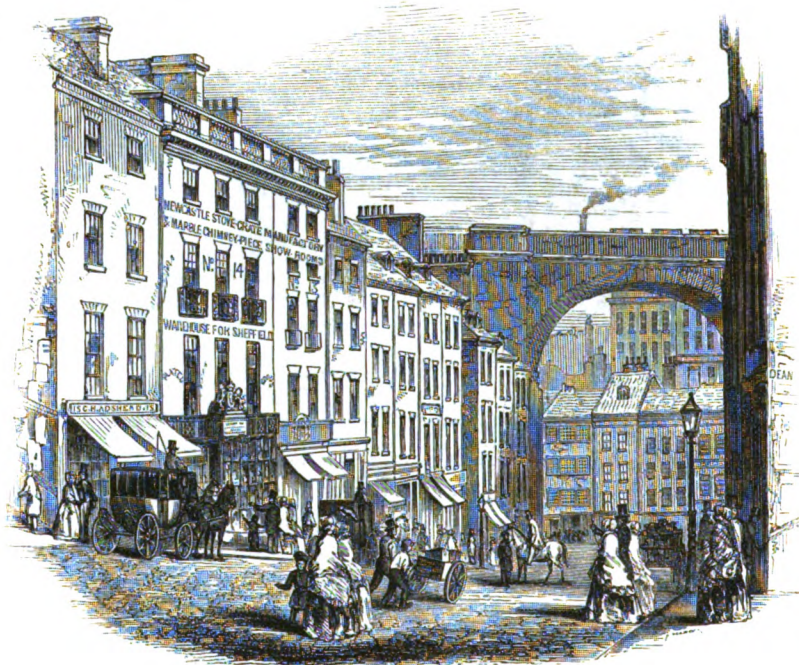
The Nether Dean or Low Bridge.

says—"It was a receptacle of all the filth of the neighbourhood." Altogether it was extremely desirable that the burn should be arched over throughout its entire course.

The introduction of wheeled vehicles instead of saddle and pack horses rendered the old streets insufficient for their purpose. On Nov. 22nd, 1786, the first mail from Newcastle to the south was conveyed by the royal mail coach; Nov. 27th, the mail was conveyed from Newcastle to the north by the coach for the first time. "The Mail" started from the Cock at the head of the Side.

At this time the only modes of reaching the Tyne Bridge from the north were by passing down the Side, or the Butcher

Bank. The Side was usually adopted, and how unfit it was for accommodating the traffic between London and Edinburgh may readily be conceived. There was, besides, no fitting communication between Westgate Street and the Tyne Bridge. Goods coming from the west had to come along High Friar Street or the Pudding Chare. Denton Chare, a narrow alley parallel to Collingwood Street was used only by foot passengers.



Dean Street, with View of Railway Arch.

Such was the condition of the main thoroughfares in Newcastle towards the close of last century. The formation of Mosley Street was the first step towards an improved state of things, and the opening of Dean Street speedily followed. Collingwood Street was not commenced until the

year 1809. Mosley Street was named after a popular alderman of that day.

We may now proceed in our examination of old Newcastle. After passing St. Nicholas Church, on our way to the river, we approach a narrow, curved, and steep street called the Side, already referred to. The upper part of it is called the Head of the Side; the lower part the Foot of the Side. The pant here used to go by the name of All-Hallow-Pant.



Old Houses. Head of the Side.

The view before us is very peculiar and interesting. On

the left are the gabled and projecting houses forming the east side of the Side. When the houses on both sides of the street projected in a similar manner persons might shake hands, at the top, from opposite windows. The corner formed by the Side, and the approach to the Castle, consists of timbered houses, dating probably from the time of Queen Elizabeth. Nothing can be more picturesque. The Black Gate and the Castle fill in the back ground of this interesting picture. In the brick house on the left of the street, now occupied as a public-house (cut p. 63), having the sign of the Meters' Arms, Admiral Collingwood was born. He first saw the light on the 26th September, 1750^(e). Originally the house has had the same picturesque form as those next to it; but it is satisfactory to know that it was modernised before the birth of Lord Collingwood. His father carried on business in the shop on the ground floor; and after his father's death his mother continued it. His brother was an officer in the customs, and lived in the house in Pilgrim Street, immediately below the entry into the coach factory of Messrs. Atkinson and Philipson.

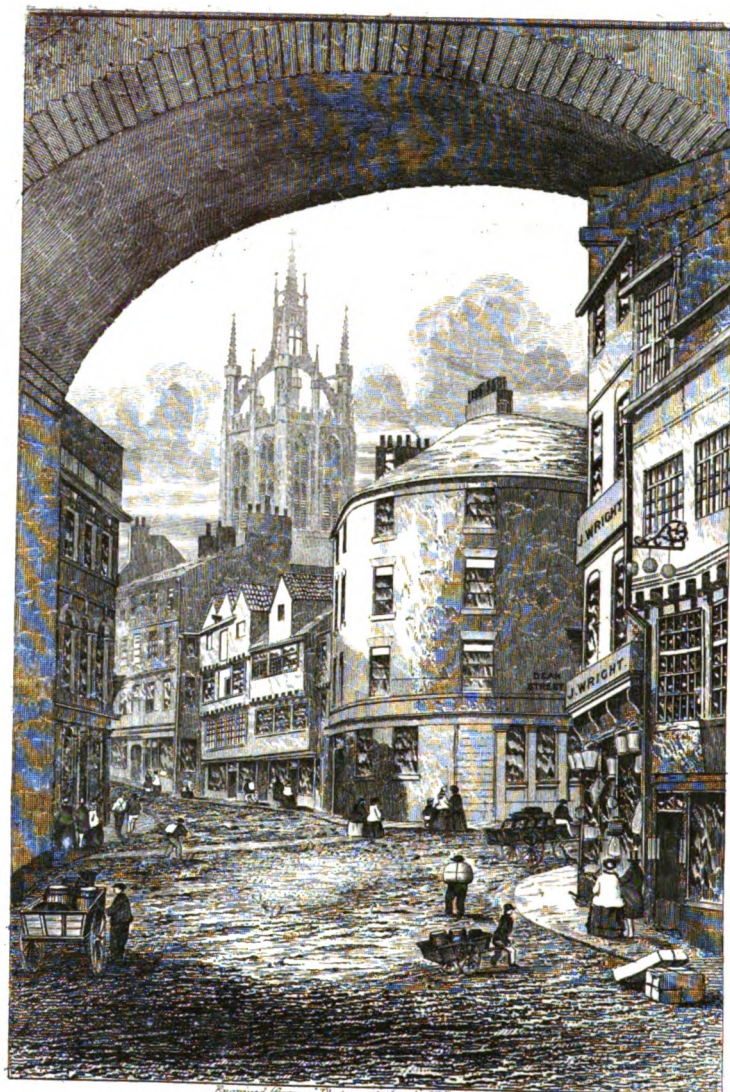
In Bourne's day the Side was "from the one end to the other filled with shops of merchants, goldsmiths, milliners, and upholsterers;" now, the shops of shoemakers and cheese and bacon factors prevail.

In proceeding down the Side, it will be well to turn into Hogg's entry, on the right hand, to examine the bastions of the Black Gate and the curtain wall of the Castle, as it proceeds from it. Further down the street, on the left-hand side, are some entries, such as the Burnt House entry, into which, if we look, we will see how closely, in days of yore, houses were packed together, and how much taste was often displayed in their construction.

The railway arch, under which we now go, is one of the

^(e) The brick house shown in the woodcut is the one in which Collingwood was born. It was purchased in 1783 of Mrs. Milcha Collingwood, the mother of the Admiral, by Mrs. Catherine Harvey, grandmother of the Messrs. Harvey, the present proprietors. From a deed, which the writer has seen, dated 1 March, 1747, and others of later date, it is evident that Mr. Cuthbert Collingwood, the father of our naval hero, was at that time—three years before the birth of his eldest son—in far from a flourishing condition, and that he had not recovered himself at the time of his death. It is not improbable that these apparently adverse circumstances led to Lord Collingwood's being sent to sea, and that at the early age of 11 years. He entered the service under the care of Captain Brathwaite, who was the son of his mother's sister.

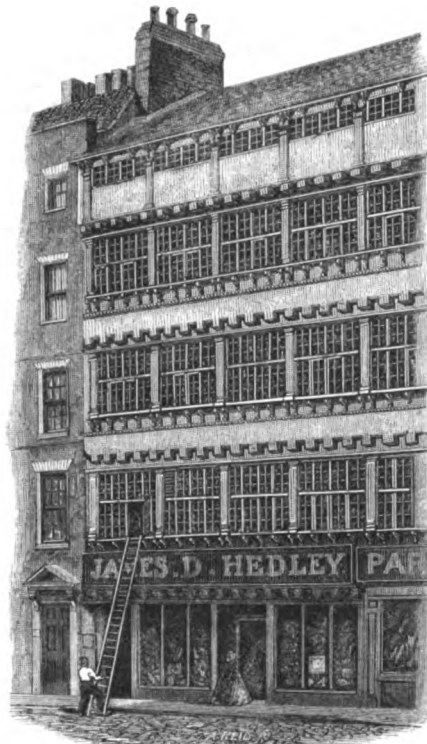




Engraved from a Photograph by And. Reid, Newcastle.

THE SIDE.

finest elliptical arches in the world. Let the stranger, having gone under it, turn round and arrange his position so that the arch shall form a framework, embracing the spire of St. Nicholas and the old houses of the Side, he will have a picture that he cannot but look on with interest. In the opposite direction, looking towards the river, the view is rendered interesting by the curious blending of the old timbered houses of the Side and Sandhill, with the new stone buildings in the Italian style that are rising up between the Side and the Quay.



The House of Aubone Surtees, Esq., Banker.

boast. Those on the east side are

The open space before us is the Sandhill: it was in former days overflowed by the tide. The Kale Cross, round which the market gardeners assembled with their vegetables on market days, stood on the west side of it; the fish market was held on the east, in front of the Guildhall. The fish market is now confined to its own arena, and the gardeners have gone "up street."

The extensive bacon market which is held here has been already referred to. In this part of the town we have some of the largest as well as the handsomest of the antique houses of which the town can boast. Those on the east side are peculiarly graceful,

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though some of them appear to be tenantless, and evidently require a helping hand. On the opposite side of the Sandhill is a house which possesses something of an historic interest. Let the stranger look up at the windows over the shop of Mr. Hedley, grocer, No. 41. He will admire their quaintness and their spaciousness. They were constructed before the exigencies of a great continental war compelled the imposition of a window tax. One storey towers above another, and pilasters and projecting corbels give variety to the expanded front of the mansion. On a November night (18th) in 1772, one Jack Scott stood gazing up at these windows. He was not admiring the external beauty of the fabric, but looked for light from within. At length a lady appeared at the window, a ladder was planted, and the future Chancellor obtained his bride. The lattice by which Miss Surtees escaped has a blue pane of glass in the centre, to distinguish it from the rest of the window. The biographer of Lord Eldon, in describing the attractions of this lady, says, "her form was slender." It must have been, or she could not have got through so narrow an aperture. The interior of this house, which in 1772 was occupied by Aubone Surtees, Esq., banker, in Newcastle, is worth examination. The offices of Messrs. Bilton, Williams, and Co., are on the first floor. The sides of the principal apartment are covered with oak panelling. The wood carving around the fireplace is very elaborate, and in excellent taste. Fortunately we are at no loss as to the name of the builder of the mansion or the date of its erection. On the left of the fireplace are the initials A. C., and on the right T. D., giving us the names of Thomas Davidson and his wife Anne Cox. The arms of the Cox and the Davidson family are above each cypher. The date carved upon the mantelpiece is 1637. Immediately contiguous to this apartment is the one from which Miss Surtees, in a moment of terrible indiscretion, descended. Many of the houses on the Sandhill seem to have been very substantially built and most tastefully fitted up. Let the visitor examine the offices occupied by Messrs. Chas. Clementson and Co., No. 33, Sandhill. Here is a mantelpiece of even more elaborate

carving than the former. It is of bold proportions, and the sculpture is in high relief. The royal arms are in the centre; and, arranged in separate compartments, are the four elements personified, and representations of Samson slaying the Philistines with the jaw-bone of an ass, and David cutting off the head of Goliath. The carving is of the time of Charles II., and is not without some traces of the faulty taste of that period. The tradition of the house is that it was Lord Derwentwater's town residence.

The Guildhall and other public offices occupy the south side of the Sandhill. The origin of this building seems to have been an hospital, called the *Maison de Dieu*, which was founded by Roger Thornton, in the reign of Henry IV., "for a chaplain, to pray for the soul of the said Roger," and for the sustentation of nine poor men and four poor women. Roger Thornton, during his lifetime, granted to the Mayor and Corporation, the use of the hall and kitchen of the hospital. The Honourable Company of Merchant Adventurers seem also at an early period to have found a location here. They had not, however, the exclusive use of their room of meeting, for Bourne tells us that "it was in ancient times given to the town for a young couple, when they were married, to make their wedding dinner in, and receive the offerings and gifts of their friends, for at that time houses were not large." This sentence gives us an interesting peep into the habits of the times. In 1658 Roger Thornton's building was pulled down and a new one erected. Robert Trollop was the builder of it. Trollop was buried in Gateshead Churchyard. His tombstone was prepared in his lifetime, and *is said* to have had on the north side of it a figure of himself, pointing to the Exchange, and underneath the effigy these lines:—

Here lies Robert Trollop,
Who made yon stones roll up;
When death took his soul up,
His body fill'd this hole up.

This new Town Hall seems to have been, for its time, a taste-

ful building. The style of its architecture was a blending of Gothic with Italian. It was adorned with a steeple, a sun-dial, which was afterwards replaced by a clock, and a statue of Charles I. The main floor was approached by an external staircase, covered by arches and protected by balustrades. When John Wesley was in Newcastle he had occasion to address the people from one of the landings on this staircase. The preacher was assaulted by some riotous persons when a fishwoman of the name of Bailes rushed to his assistance. Putting one hand round his waist, she extended the other with clenched fist towards his assailants and exclaimed—"Now, touch the little man if you dare." Her appeal was irresistible, and the preacher proceeded in peace. Her son rose to a respectable position in society. The present Guildhall is substantially the same as that which Robert Trollop erected; but its northern and southern fronts have been reconstructed. The buildings at its east end—the merchants' court and the fish market—are modern erections.

The Guildhall is used for meetings of the freemen, and of the inhabitants of the town, for the assizes and the sessions. Its arrangements, as a place of public audience, are not altogether satisfactory. At the upper end of it are paintings of Charles II. and James II., of the date of 1686, and a portrait of George III., by Ramsay, presented to the town in 1779 by Sir Matthew White Ridley. At the other end of the hall are portraits of three noble natives of Newcastle, Eldon, Collingwood, and Stowell. The merchants' court adjoins the guild hall. Although this part of the building is new, the internal decorations of the court are old. The wood carving by which it is surrounded bears the date of 1636. The principal subjects of its elaborately carved mantelpiece are the Judgment of Solomon and the Miraculous Draught of Fishes. Probably the designer wished to indicate the sagacity which should characterise the ventures of a merchant, and the good success which often follows honest and prudent speculation. The arms of the governors of the company, since the year 1628, are

emblazoned on the sides of the room. Amongst them we recognize the bearings and names of many well-known Northumbrian families—the Bewicks, Claverings, Ellisons, Fenwicks, and Riddleys. The plate of the company is worth inspection. Three cups, silver-gilt, are preserved in the original case. An inscription tells us that they were presented to the company in 1649, and were re-gilt in 1745—two years of evil portent; on the one Charles I. was led to the block, on the other the late unnatural rebellion occurred—it is to be hoped that they will never again be meddled with. The Mayor's chamber is the only other room in this pile of buildings that we need examine. Here the Common Council used to assemble and the Magistrates to sit. The oak panellings round the room are covered with paintings of local objects. They would have been very valuable had they not been too largely indebted to the skill of the gentleman who renovated them; the picture of the Exchange is genuine. A few moments may be spent in inspecting the town regalia; they consist of a ponderous mace of silver-gilt, bearing the date of 1687; several smaller maces of silver, belonging to the sergeants-at-mace; two swords, one of which is carried in processions, the other lies, with terrible significance, on the table before the Judge at the Assizes; and a somewhat uncomfortable head-dress, called the cap of maintenance. The Mayor for the time being wears, on all state occasions, a massive gold chain around his neck, and he usually carries with him an official snuff-box of silver-gilt; the Sheriff has a gold snuff-box. One piece of furniture used to hang over the bench in the Mayor's chamber, and more recently in the Police Court, in the Manors, which has, for the present, been removed to the antiquarian museum in the Old Castle. This was the Branks, an instrument for assisting ladies, unduly loquacious, to preserve silence. The branks consist of an iron framework fitting the head, and provided with a spike, which forces itself into the mouth of the wearer when the apparatus is locked behind.

Formerly all the offices of the Corporation were concentrated in this building, and amongst them that of the Trea-

surer, which was on the ground floor. Before banks existed, a strong treasure-box, called a *hutch*, was provided, into which the town dues were put as they were received. By a natural process of thought, the term *hutch* was extended to the place in which the business of the Treasurer was transacted, and to the Treasurer himself. The identical chest long in use at the Guildhall is now in the Treasurer's office in the new buildings. It is a curious relic of a state of things long past. It is probably 400 years old. There is a hole in the lid to admit the money. It is provided with eight locks; the Mayor kept the key of one; seven chamberlains the others; and it could only be opened in the presence (or with the consent) of all the eight persons. During business hours two chamberlains sat, day after day, on each side of the hutch; they counted the money which the Treasurer received, and saw him duly drop the pieces into the chest. At certain periods the chest was opened, the money counted, and the requisite payments made. Matters are much simplified now by means of a bank pass-book and cheques. In the new office of the Town's Treasurer, there is a picture which also gives us a glimpse into the state of manners half a century ago. It is a portrait of "Old Judy," the messenger to the hutch. Judith Dowlings was in truth the guardian of the hutch. With that stick of hers, which she was nothing loth to use, she kept at bay all whom she conceived had no right to come there. Some shoulders still ache at the thought of her. The ground floor, beneath the Guildhall, is used as a news-room and exchange.

Before finally leaving the Sandhill, the stranger who wishes to get a glimpse at Old Newcastle, may advantageously proceed for some distance along the street to his right, called the Close. Bourne gives this account of it:—"It answers its name exactly well, for it is but narrow and close too. It was formerly that part of the town where the principal inhabitants lived, Sir John Marley, Sir William Blackett, Sir Ralph Milbank; and the houses of many other gentlemen of figure are still remembered by the ancient inhabitants. And indeed, however, the street itself may be, however

mean the fronts of the houses are, within, they speak magnificence and grandeur, the rooms being very large and stately, and for the most part adorned with curious carving." He also adds, "The Earl of Northumberland's house was in this street." The street is now almost wholly given up to commerce. There are many bonded warehouses in it. The visitor in passing along will notice the stairs on his right hand, leading to the higher part of the town—the Castle Stairs, the Long Stairs and the Tuthill Stairs. If he pleases, he may fancy that he sees Brougham, Scarlett, and other eminent barristers in wig and gown racing up and down these stairs, distracted between causes, that are being tried at the same time, in the town's court, on the Sandhill, and in the county court beside the Castle. The inconvenience arising from holding the courts in places so far removed is still felt.

About half way along the Close, and on the side next the river, stands what used to be the Mansion House of Newcastle. It is now the timber warehouse of Messrs. Carr; adjoining it is a powerful sawmill. The Mansion House was built in 1691. Here the Mayor took up his residence during his year of office, and here he dispensed the hospitalities of the metropolis of the north. He was allowed a salary of £2,000 a year besides a state coach, a barge, and the use of a valuable service of plate. One of the first acts of the New Corporation (1836) was to abolish the Mansion House and sell the furniture, books, pictures, wine, and plate. There were upwards of 370 dozens of "fine old port" in the cellar. Whatever may have been thought at the time, it is generally felt now that this was a mistake; that the dignity of the town requires that its Chief Magistrate should have an official residence becoming his rank; and that he should have it in his power to dispense the hospitalities of the town to distinguished strangers, and others having a claim upon him, without resorting to a tavern. It is curious to range through the rooms of this fine old house, where the King of the Belgians, the Duke of Sussex, Lord Wellington, Lord Eldon, and other eminent personages have been entertained; where the youth,

beauty, and rank of both town and county were frequently assembled, and find nothing but dirt, dilapidation, and deals!

By the side of the river was a quay, where the Mayor's barge was usually moored, and where, when occasion required it, he took to the water. The Judges stayed with the Mayor, during the Assizes, and it was usual with him to give them, during their residence, a row down to Tynemouth. An event occurred at one Assizes which gave rise to the popular local song of "My Lord 'Size." It is from the pen of the late Mr. John Shield. As it possesses great merit—as it serves to illustrate some of our statements respecting Old Newcastle—and as it gives us a moderately chaste specimen of the language of the great majority of the people of the town, at the time it was written, we give it in full. The unlucky judge was Baron Graham.

The jailor, for trial, had brought up a thief,
Whose looks seemed a passport for Botany Bay;
The lawyers, some with and some wanting a brief,
Around the green table were seated so gay;
Grave jurors and witnesses, waiting a call;
Attorneys and clients, more angry than wise;
With strangers and towns-people, throng'd the Guildhall,
All waiting and gaping to see My Lord 'Size.

Oft stretch'd were their necks, oft erected their ears,
Still fancying they heard of the trumpets the sound,
When tidings arriv'd, which dissolved them in tears,
That my Lord at the dead-house was then lying drown'd!
Straight left tête-à-tête were the jailer and thief;
The horror-struck crowd to the dead-house quick hies;
Ev'n the lawyers, forgetful of fee and of brief,
Set off helter-skelter to view My Lord 'Size.

And now the Sandhill with the sad tidings rings,
And the tubs of the taties are left to take care;
Fish women desert their crabs, lobsters and lings,
And each to the dead-house now runs like a hare;
The glassmen, some naked, some clad, heard the news,
And off they ran, smoking like hot mutton pies;
Whilst Castle Garth tailors, like wild kangaroos,
Came tail-on-end jumping to see My Lord 'Size.

The dead-house they reach'd, where his Lordship they found,
Pale, stretched on a plank, like themselves out of breath,
The Coroner and Jury were seated around,
Most gravely inquiring the cause of his death.

No haste did they seem in, their task to complete,
 Aware that from hurry mistakes often rise;
 Or wishful, perhaps, of prolonging the treat
 Of thus sitting in judgment upon My Lord 'Size.

Now the Mansion House Butler thus gravely depos'd :—
 "My Lord on the terrace seem'd studying his charge;
 And when (as I thought) he had got it compos'd,
 He went down the stairs, and examin'd the barge;
 First the stem he survey'd, then inspected the stern,
 Then handled the tiller, and look'd mighty wise;
 But he made a false step when about to return,
 And souse in the river straight tumbled Lord 'Size."

Now his narrative ended, the Butler retir'd,
 Whilst Betty Watt, mutt'ring (half drunk) thro' her teeth,
 Declar'd "in her breest great consarn it inspir'd,
 That my Lord should sae cullishly come by his deeth;"
 Next a keelman was call'd on, Bold Airchy his name,
 Who the book as he kiss'd shew'd the whites of his eyes,
 Then he cut an odd caper, attention to claim,
 And this evidence gave them respecting Lord 'Size :—

"Aw was settin' the keel, wi' Dick Stavers an' Matt,
 An' the Mansion Hoose stairs we were just alongside,
 When we a' three see'd somethin', but did'nt ken what,
 That was splashin' and labberin' aboot i' the tide.
 'It's a fluiker,' ki Dick; 'No,' ki Matt, 'it's owre big,
 It luik'd mair like a skyet when aw furst seed it rise.'
 Kiv aw—for aw 'd gotten a gliff o' the wig—
 Ods marcy! wey, marrows! becrike, it's Lord 'Size!

Sae aw huik'd him, an' haul'd him suin into the keel,
 An' o' top o' the huddock aw rowl'd him aboot:
 An' his belly aw rubb'd, an' aw skelp'd his back weel,
 But the water he'd druck'n it wad n't run oot;
 Sae aw brought him ashore here, an' doctors, in vain,
 Furst this way, then that, to recover him tries;
 For ye see there he's lyin' as deed as a stane,
 An' that 's a' aw can tell ye aboot My Lord 'Size."

Now the Jury for close consultation retir'd:
 Some "*Death Accidental*" were willing to find;
 Some "*God's Visitation*" most eager requir'd,
 And some were for "*Fell in the River*" inclin'd:
 But ere on their verdict they all were agreed,
 My Lord gave a groan, and wide open'd his eyes;
 Then the coach and the trumpeters came with great speed,
 And back to the Mansion House carried Lord 'Size.

A little beyond the Mansion House we come to the place

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where the town wall crossed the street and the Close gate stood. Traces of both gate and wall remain.

On returning to the Sandhill we may notice the street leading to the Tyne Bridge, and the bridge itself. The street is rather narrow, and the turnings into it sufficiently angular, but both were worse formerly. The chapel belonging to the Hospital of St. Thomas à Beckett stood on the west side of the Exchange, and greatly blocked up the road. It was removed in 1830, and a large part of its site thrown into the street.

We now approach the bridge. The old structure was narrow, and, moreover, was crowded with houses, which clustered upon its battlements. There was on it, besides, a hermitage and a chapel to the Virgin. At the Newcastle end of it was a gateway tower; in the middle of it another; and at the Gateshead end of it a third. Each of them was provided with a portcullis.

According to the law against high treason, as it existed during the Middle Ages, the heads and bodies of persons guilty of the crime were liable to be exposed to public gaze in such places as might be directed. Often on the Magazine or Newcastle gate of the Tyne Bridge has the ghastly spectacle been beheld. William Wallace was put to death as a traitor in London, on the 23rd August, 1305, his head being struck off, and his body quartered; that quarter of which his right arm formed a part was sent to Newcastle for exposure. According to the Chronicle of Lanercost, his head was exhibited on London Bridge, his right hand quarter on Tyne Bridge (*super pontem Novi-Castri super Tynam*). The other quarters were exposed at Berwick, Perth, and Aberdeen. On the 18th of February, 1408, Henry Earl of Northumberland was slain at the battle of Bramham Moor. One quarter of his body was put up at Newcastle-upon-Tyne (most likely on the bridge); but in the May following, with the three other parts and his head, it was taken down to be delivered to his friends, and solemnly buried.

The town of Newcastle was charged with repairing

two-thirds of the bridge, the Bishop of Durham the other third. A blue stone upon the bridge has, from time immemorial, marked the division between the town of Newcastle and the county of Durham. During the Middle Ages, when the bridge required reparation, it was usual to raise the necessary funds by the issue of indulgences.

In 1771 the bridge was in a great measure carried away by a flood. "This flood," says Charles Hutton, "was the most dreadful inundation that ever happened in this part of the country, and was occasioned by excessive rains which fell here, but more especially westward, about the head of the river, from Friday evening, the 15th November till the Sunday forenoon following. About midnight between the Saturday and Sunday, the water rose so high at the bridge as to fill up the arches, and overflow the Close, Sandhill, Quayside, and other parts of the town, so that in the morning the inhabitants plied with boats about these parts, and four vessels were floated and left upon the quay, when the water rose about nine feet higher than the usual spring tides. Early on the Sunday morning the middle arch of the bridge fell, and in the afternoon of the same day a second, and others were so much shattered that two more fell two days afterwards. Together with these four arches fell 23 houses and buildings which stood upon them, and six of the inhabitants perished in the ruins."

This terrific flood carried away every bridge over the Tyne, except that at Corbridge. It was long known in the district as "*The flood*."

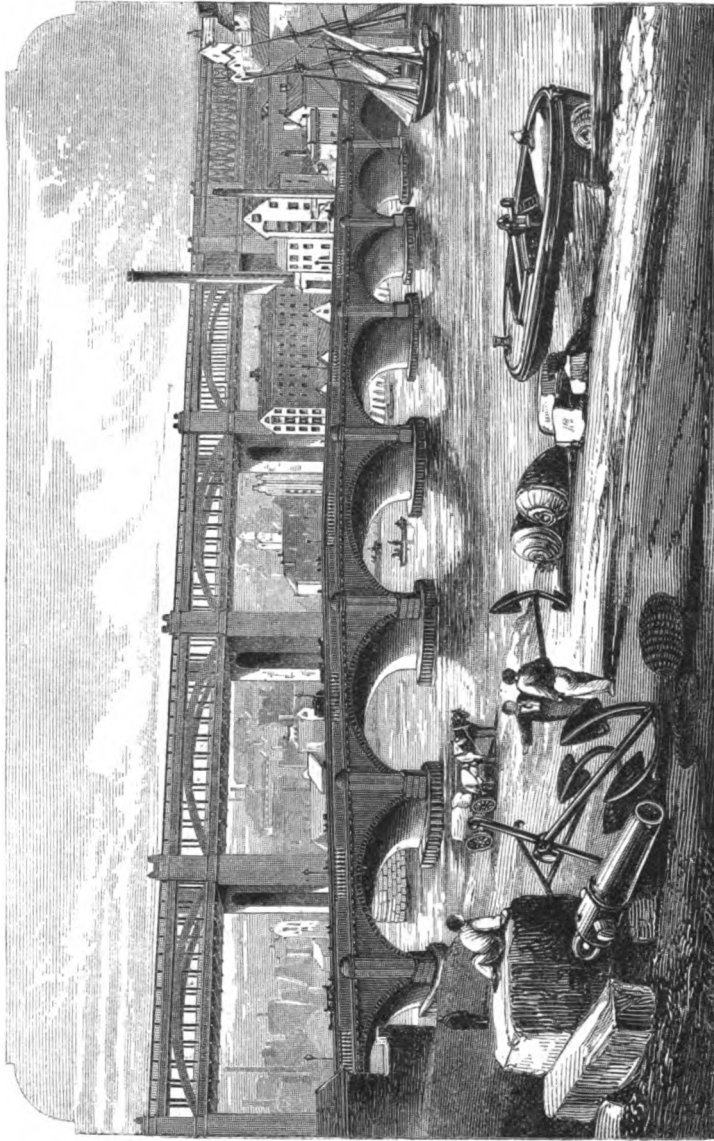
On one occasion a gentleman of the name of Mr. Adam Thompson was put into the witness-box at the Assizes. The counsel asking his name received for answer—"Adam, Sir, Adam Thompson, Sir." The next question was—"Where do you live?" "At Paradise, Sir." (Paradise is a village which used to be an exceedingly pretty one, about a mile and a half west of Newcastle.) The barrister, surprised at his answers, next said, in a quizzical tone—"And how long have you dwelt in Paradise, Mr. Thompson?" The answer, "Ever since the flood, Sir," which was perfectly

intelligible to most of the bystanders, put the questioner fairly out of gear. Explanations followed.

The present bridge was completed in 1779; it was widened and enlarged in 1801; and, probably, in a very few years hence, it will again be considerably altered to allow ships to pass higher up the river; or, be removed altogether. The woodcut on the opposite page exhibits this Bridge, as well as the more recent structure of Robert Stephenson.

We now proceed to the Quayside. This is the chief seat of the commerce of the town. Here is the Custom House and the offices of most of the merchants and brokers interested in the business of the port. In no part of the borough are houses massed together so closely as here, but the great fire of 1854 has in part remedied the evil. Numerous narrow lanes or alleys abut upon the row of houses parallel with the quay. Some of the narrowest of them are destroyed, but some of those which remain remind us of the narrowest of the streets of Genoa or Venice. In accordance with the usual nomenclature of Newcastle they are called chares. This term has occasionally been a source of trouble to judges and counsel at the Assizes. On one occasion, William Russel, deputy surveyor of the town, was put into the witness box and desired to state what he knew respecting the subject of investigation. He began thus—"As I was going along the Quay I saw a hubblesheew coming out of a chair foot." Here he was stopped and asked what it was that he said. A repetition of his narrative did not enlighten his hearers. At last the Town Clerk interfered, and told the Judge that, in the language of Newcastle, a "chair foot" was the lower part of a narrow lane or alley, and that by "hubblesheew" was meant a riotous concourse of disorderly people.

No description of the Quayside is needed. The visitor will soon know all that is to be learnt respecting it. During most of the day it is a crowded, busy, bustling thoroughfare. Ships are being loaded and unloaded, carts filled with goods pass to and fro, and merchants stand thickly upon the pavement, engaged in making bargains, or trying to do so. Three hydraulic cranes, worked with wonderful ease, facili-



The Two Bridges.

tate the loading of the ships. Besides these, there is another capable of lifting 60 tons, which is worked by hand power.

Reference has been made to the great explosion of 1854. On the opposite side of the river, a vacant space indicates the spot where it occurred. Shortly after 1 o'clock in the morning of the 6th of October, in that year, a fire was discovered in a worsted manufactory in Hillgate, Gateshead, near the bridge. The flames spread eastward, and in a short time ignited a large warehouse, which, together with a great variety of other goods, contained 3,000 tons of sulphur, 130 tons of saltpetre, 5 tons of turpentine, and $1\frac{1}{2}$ tons of naphtha. By 3 o'clock the building was one mass of flames. At a quarter-past three a terrific explosion occurred. "The burning piles of brimstone, with stones, metal, and articles of every description, were thrown into the air with the force of a volcanic eruption, and fell with alarming force upon the dense masses of people assembled, and all the surrounding buildings." The smoke arising from it calmly ascended in the form of an inverted cone, and then gently passed off to the east. Fifty-three persons were killed by the explosion. Houses were thrown down, whole streets unroofed, windows almost universally smashed, and fresh conflagrations kindled in various parts of Newcastle and Gateshead. The new buildings on the Quayside, in the Side, and the Butcher Bank, sufficiently indicate the havoc made by the fire at this time on the north side of the water. The almost universal impression at the time was, that, contrary to existing regulations, the warehouse had contained gunpowder. Notwithstanding the most searching investigation no evidence could be elicited to countenance the idea.

Let the visitor now enter Trinity Chare, and visit the hospitals, chapel, and hall of the Trinity House, which he will find at the upper end. The change from the dust, confusion, and noise of the Quay, to the calm seclusion of these clean and well-kept establishments, is very striking. The Trinity House was once a powerful and rich body. Acts of Parliament have of late materially modified its powers. The present buildings will probably ere long

make way for some contemplated improvements. The entrance-hall is used as a kind of museum. Here is a model of a full-sized line of battle ship, made by the French prisoners at Portsmouth out of the beef bones of their rations. Amongst the tortoises and sharks, hung from the roof, is a half-burnt rafter—facetiously termed a flying-fish—which was projected into the premises at the time of the explosion.

The hall is a fine room, adorned with some good pictures. The chapel is calculated to hold about 90 people. It dates from the year 1491. The roof is formed of timber, and has the appearance of the under part of a ship's deck. The pulpit, the Master's seat, the pews, and all the fittings are good specimens of Elizabethan work. There is service here every Sunday afternoon. The House maintains 26 pensioners. If we leave the Trinity House by the Broad Chare, we will see attached to this front of it an ancient anchor, fished out of the Tyne in 1770, and said, though probably erroneously, to have belonged to the Spanish Armada.

Returning to the Quayside, we will proceed eastward. The last lane on the Quay is Love Lane. In it Mr. William Scott, the father of Lord Stowell and Lord Eldon, resided. In consequence of the expected attack upon the town by the Pretender, in 1745, Mrs. Scott was removed to Heworth, immediately before giving birth to her eldest son, Lord Stowell. Lord Eldon was born in Love Lane. The house is not standing; but another in the same lane, to which his father removed when he was yet a child, and where he spent his youthful days, yet exists, though it has undergone many changes; it is occupied by Messrs. Ridley and Thompson, wine merchants.

The Quayside ends at the place where the town wall came down to it; some remains of the wall are to be seen. The Quay is continued for some distance further, under the denomination of the New Quay, and beyond it are the wharves to which the steamers trading with London, Hull, Leith, Aberdeen, Rotterdam, and Hamburg resort.

Parallel with the New Quay is an ancient street of great

celebrity called Sandgate. It used to be the Wapping of Newcastle. Here the sailors belonging to the port, and the keelmen navigating the keels, or barges which conveyed the coals to the ships, resided. These were for the most part rough, untutored men; but they had the manly qualities and the warm affections of the English seaman. Their houses were clean and tidy, and on the mantelpiece might often be seen a showy teapot bearing the inscription

"My heart is fixed, it cannot range,
I love my choice too well to change."

The local song "The Keel Row" is intimately connected with this locality. The air to which it is sung is exquisitely beautiful, and never fails, when its strains are heard, to raise the soul of every Tyneside man.

The introduction of steamboats, and the general use of staiths, by which the coals are conveyed direct from the wagon to the ship have greatly reduced the number of keelmen in Newcastle. Sandgate is chiefly occupied now by the natives of Ireland.

The Keelman's Hospital is in the New Road, just above Sandgate. It was erected for the benefit of aged and infirm keelmen, and chiefly at their own cost. It was finished in 1700, and cost £2,000. Dr. Moor, Bishop of Ely, remarked of this hospital "that he had heard of and seen many hospitals, the work of rich men; but that it was the first he ever saw or heard of which had been built by the poor." It is a square building, having low walks around it in imitation of cloisters.

A little ingenious piloting through Pandon—that ancient abode of Saxon royalty—and the Dog Bank will bring the visitor into the Butcher Bank. One side of the Butcher Bank has been removed by the fire of 1854, but several houses on the other side are left.

At the foot of the Butcher Bank, a few months ago, stood a large quaint-looking old house, known by the name of the Nag's Head Inn. According to tradition (which in this case is not supported by testimony), it was the home of the

Mayors of this town, before they took up their residence in the Close, and was occasionally the abode of royalty. Four Norwich travellers, whose journal has been twice printed,



The Old Nag's Head Inn.

lodged here in 1634. It was even then a "fayre inn," in which they "tasted a cup of good wine" (*f*). This "stately, prince-like, freestone inn" of the 17th century, has undergone a change, to which allusion will afterwards be made.

(*f*) See Mr. Longstaffe's notice of it in the *Archæologia Æliana*, N.S., v. vi., p. 163.

Unhappily the house in which Mark Akenside, the author of *The Pleasures of Imagination*—the ablest didactic poem



House in which Akenside, the Poet, was born.

in the language—was born, has, of late years, undergone renovation. It is the house No. 33, and is occupied by a person who sells ale and porter. The house next door, which remains in its primitive state, is precisely similar in size and form to the one in which the poet first drew breath. It is a curious specimen of the houses of the period. An outside stair leads to the rooms above, which are of small dimensions and heavily timbered. The reader will not regret to have laid before him a specimen of the poet's skill. It was written in the last year of his life. It is pleasing to find, notwithstanding his foolish disgust at his humble birth, with what enthusiasm his thoughts reverted to the scenes of his early youth. It occurs in a fragment of his fourth book of *The Pleasures of Imagination*.

O ye dales
Of Tyne, and ye most ancient woodlands; where
Oft as the giant flood obliquely strides,
And his banks open and his lawns extend,
Stops short the pleased traveller to view,
Presiding o'er the scene, some rustic tower
Founded by Norman or by Saxon hands:
O ye Northumbrian shades, which overlook
The rocky pavement and the mossy falls
Of solitary Wensbeck's limpid stream!
How gladly I recall your well-known seats
Beloved of old, and that delightful time
When all alone, for many a summer's day,

I wandered through your calm recesses, led
In silence by some powerful hand unseen.
Nor will I e'er forget you ; nor shall e'er
The graver tasks of manhood, or the advice
Of vulgar wisdom, move me to disclaim
Those studies which possessed me in the dawn
Of life, and fixed the colour of my mind
For every future year.

From the upper end of the Butcher Bank, Pilgrim Street springs. This street took its name from the circumstance that pilgrims on their way to the little chapel at Jesmond usually passed along it. Pilgrim Street is a fine one, but it has few features which call for remark. Several old inns stand in the lower part of it, before coming to the Arcade, such as the Fox and Lamb, the Robin Hood, and the Pack Horse ; but all of them have lost most of their ancient peculiarities. The one last named has recently been rebuilt.

Proceeding onwards, we have Mosley Street on our left hand and Manors Street on our right. The only structure in the Manors inviting our attention is the Freeman's Hospital, which stands upon the site of the Monastery of the Augustine Friars. It is a brick building, with a piazza in front, erected in 1681.

Proceeding up the street, we come, on the left, to the Queen's Head Inn. Curiously enough, this house of modern entertainment occupies, as nearly as possible, the exact site of the ancient hostel where the pilgrims of old put up, when they came to visit the chapel at Jesmond. Bourne tells us that the Pilgrims' Inn was on the west side the street, exactly 116 yards one foot from the southmost corner of Upper Dean Bridge.

Higher up we come to the site of Anderson Place. This building occupied, as nearly as possible, the roadway of Grey Street from Hood Street to Shakespere Street. Grey, in his *Chorographia*, says—"It is a princely house, built out of the ruins of the [Grey] Friars." Bourne, after quoting this remark, says—"And indeed it is no less than very stately and magnificent, being supposed the most so of any house

in the whole kingdom within a walled town. It is surrounded with a vast quantity of ground. That part of it which faces the west is thrown into walks and grass plats, beautified with images, and beset with trees, which afford a very pleasing shade. But this house is not more remarkable or memorable upon any account than for its having been the lodgings of King Charles the First, whilst he was a prisoner at this town."

Pilgrim Gate, as already observed, separated Pilgrim Street from Northumberland Street. It stood on the spot where the four streets, Blackett Street, Northumberland Street, New Bridge Street, and Pilgrim Street meet together.

Proceeding along Northumberland Street, we have, on the left hand, the site of the Orphan House, erected by John Wesley. The old building, so intimately connected with the history of that great man, has recently been removed, and some new school-rooms erected in its stead.

At the further end of the street we come once more to the Barras Bridge, having seen most of the objects in the old town that are worthy of notice.

Before turning our attention to the new town, it may be well to visit the ruins of the little chapel at Jesmond, which, during the Middle Ages, was an object of considerable interest. Bourne says that "pilgrims came from all parts of the kingdom to worship at Our Lady's Chapel at Jesmond." In Roman Catholic countries at present, there generally stands, in some pretty spot, at a convenient distance from the towns, a chapel dedicated to the Mother of our Lord, to which, in the summer season, it is customary for the inhabitants of the neighbouring district to resort on a particular day. A procession is formed, consisting of a few priests in canonicals, bearing crucifixes and banners, followed by a long train of young women dressed in white; a miscellaneous throng bring up the rear. The simple music of the chant, the varied vestments of the persons chiefly interested, the light-heartedness of the holiday-makers, and the usual fineness of the season, render these rustic excursions exceedingly

agreeable. Not a few persons ramble from place to place that they may enjoy as many *festas* as possible.

The Chapel at Jesmond has been but a small one. The ruins of it are not imposing, but covered with ivy as they are, and being situated in a most delightful spot, they will repay a visit. Near to the ruins are two very fine ash trees; their branches droop, and their forms are very graceful. Selby in his *British Forest Trees* (p. 87) notices some similar ones at Morpeth and Mitford. Not far from this spot is the residence of Sir William Armstrong. The gardens attached to the house present several features of interest, and the whole of the dean in front of the mansion is beginning to assume those charms which art can lend to a spot naturally so beautiful.

The name *Jesmond* requires a passing remark. Deceived by the modern aspect of the word, some persons have amused themselves and others by interpreting it the "Mount of Jesus." The fact that the chapel and hospital were dedicated to "Our Lady" suggests a preliminary doubt as to the correctness of this rendering. The truth is that the ancient form of the name was *Jesemuthe*, which the Rev. John Hodgson thus explains—"The *mouth* of the *Ews*-burn; for the addition of the *g* and the *j* is nothing but the Saxon particle *ge*, so long unnecessarily retained in our language, and sometimes pronounced hard and sometimes soft." (*Hist. Nov. Pt. II. v. i. p. 87n.*) The name of the neighbouring village of Gosforth admits of a similar explanation, it being the place where there was a *ford* over the *Ouse*-burn.

OLD GATESHEAD.

GATESHEAD formerly consisted chiefly of the High Street, which was formed by a number of houses clustered on both sides of the road leading to Newcastle, and of Hillgate and

Pipewellgate, two narrow streets parallel with the river, which joined the main street at the south end of Tyne Bridge. The lower part of the High Street is called Bottle Bank. This name, says Brand, is derived "not by corruption from Battle Bank, (from I know not what battle said to have been fought there), but evidently from the Anglo-Saxon *bottle* a village—the Bank of the Village." This street is as steep and narrow as the Side, in Newcastle, and yet, until the formation of the more circuitous road by St. Mary's Church in 1826, it too formed part of the great highway between London and Edinburgh.

The church is a large and commodious structure, but has no architectural features of peculiar interest. Such parts of it as are original are supposed to bear the date of about 1450. In the year 1080 Gateshead Church was the scene of a remarkable transaction. Walcher, a native of Lorraine, was made Bishop of Durham by the Conqueror. He was skilful in repressing, by the sword, the rebellions of the native English. The wrath of the people was, at the time referred to, roused by the murder of a Saxon named Liulph, a man dear to the whole country, when the bishop, expecting no danger, came to hold his court (*cour du comté*) in Gateshead. The people demanded an explanation, but, receiving no satisfaction, the cry was raised "*short red, good red, slea ye the byshopp !*"—short counsel is good counsel, slay ye the bishop. The church was set fire to, and the foreign prelate, with his Norman and Flemish followers, were slain as they attempted to escape from it.

The Chapel of St. Edmund's Hospital is a simple but exceedingly chaste specimen of the Early-English style, erected at the beginning of the thirteenth century. It stands by the side of the High Street. It remained a ruin until 1836, when the late Mr. Cuthbert Ellison presented it to the Rector and Churchwardens of Gateshead; by whom, with the assistance of the public, it has been fitted up for divine service.

THE SOCIAL ASPECT OF NEWCASTLE

AT THE CLOSE OF THE LAST AND THE BEGINNING OF
THE PRESENT CENTURY.

AN inspection of Hutton's Plan of Newcastle, which was published in 1772, shows us that a large part of the space within the walls of the town—probably one-third—was occupied by gardens and meadows. Outside the walls, where dense masses of buildings now stand, the haymakers pursued, at the proper season, their merry occupation. Up to a comparatively late period the town preserved something of its rustic appearance. A colony of rooks were, in memory of some now living, in possession of the trees in Green Court; and it is but a year or two since the crow trees at the Barras Bridge became tenantless. Some trees grew in Newgate Street, at the point where Clayton Street now crosses it; and some very fine ones grew in the Vicarage grounds, which were occupied by a fraternity of crows. The writer has a pleasing reminiscence of the red-streak apples which grew in Dr. Smith's garden, behind his house in Westgate Street. Major Anderson used to have very fine apples, and other fruit, in his garden behind Anderson Place, previous to the introduction of gas into the town; from which time the fruit rapidly decreased in size and flavour: finally the trees cankered and died. The Major blamed the gas for this, but most probably it is chiefly to be ascribed to the increase of smoke in the town since the period referred to.

There were many beautiful walks in the immediate vicinity of the town. One of them was Pandon Dean, where the Blyth and Tyne Railway terminus now is, and another was the Maiden's Walk, extending westward from the Infirmary to a place with a name which modern refinement will not suffer to be mentioned. This walk, commanding the vales of Tyne and Ravensworth, presented scenes of luxuriance and beauty equalled by few other spots either in England or Wales. It is all covered with brick

and mortar now. In those days the atmosphere of Newcastle was comparatively pure. Shields, on the other hand, was darkened by the chimneys of its salt-pans. When the present seniors of Newcastle were young, it was a common saying with them "Up with canny Newcas'le, and down with smoky Shields." Mr. Wesley makes the following entry in his journal, under the date of June 4th, 1759:—"After preaching I rode on to Newcastle. Certainly, if I did not believe there was another world, I would spend all my summers here; as I know no place in Great Britain comparable to it for pleasantness. But I seek another country, and therefore am content to be a wanderer upon earth."

In days of yore, the noblemen and gentlemen of the North of England had houses in Newcastle, where they resided in the winter season. The town house of the Earls of Westmoreland stood upon the site of the Literary Society's Library. Tradition has it that the house at the corner of Bailiffgate and Westgate Street was built for the Duke of Northumberland. An ancient residence of the Earls of Northumberland, in the Close, fronting the river, was occupied for many years as the office of the firm of Lord Ravensworth & Partners, so well known in the coal trade as the Grand Allies. Sir Walter Blackett used to live in great state in the lordly mansion which stood on the site fronting Lambton's Bank. When Lord Collingwood visited Newcastle, during the Peace of Amiens, he resided with his father-in-law, Mr. John Erasmus Blackett, who occupied the house Mr. Sang now lives in, No. 1, Charlotte Square. The Ridley family had a house in Westgate Street, which they held till recently.

The people of former years kept earlier hours than we do. There is a picture, in the Castle, of the Sandhill, which was painted by Mr. Waters, about the middle of last century, in which several of the leading characters of the time are introduced, amongst them Mr. Ralph Atkinson, Lord Eldon's cousin; Mr. Wallace, the partner of Surtees, Lady Eldon's father; Grieve, the watchmaker; and Mr.

Snow Clayton. These gentlemen are represented as abroad, and ready for the business of the day, though by the Exchange clock it is only half-past seven. It was customary with even the better class of tradesmen then to rise at five o'clock and go straight to a public house to drink purl. This was composed of hot ale and bitters. The Scotch Arms was famous for this beverage. The fashionable dinner hour of those days was one o'clock.

Newcastle used to be famous for its ale, and well its inhabitants knew it (*f*). Some clubs kept a taster whose business it was to inform his employers in which tavern the best barrel was on tap. Mr. Soulsby had the reputation of giving the best dinners in Newcastle in his day. The late Mr. Robert Doubleday used to say that after a party had sat a sufficiently long time at his table—which was loaded with the finest Spanish and Portuguese wines—the company would adjourn, host and all, to some favourite public house, such as the Stone Cellar, in the Close, to “clear out” with beer.

Prior to the building of Mosley and Dean Streets, in 1784 and 1787, few of the shops were glazed, except where private dwelling houses had been converted into shops, and here the small parlour windows were suffered to remain. These new streets were built with *shop* windows, though not of the magnitude or splendour of the present day.

Until the introduction of turnip husbandry, fresh butcher-meat could not be had during the winter months. It was customary for families to procure their winter supply of provisions at the November or Stones Fair. When the consumption of a family was too small to require a whole ox, or “mart” as it was called, two or more families combined for the purpose. Long after the necessity for it existed, the custom of buying a mart continued. Thrifty fathers of large families, and masters having a number of apprentices, found that as the season rolled on, and the meat became salter, the daily consumption was most satisfactorily

(*f*) Cunningham, the pastoral poet, wrote a song in praise of Newcastle beer.

diminished. The late Mr. Geo. Richardson told the writer that, when he first came to Newcastle, nothing but salt meat was exposed for sale in the butcher market during winter. Mr. Fenwick states the same thing. Poultry, especially geese, were plentiful and cheap. Fish was also abundant and cheap. Occasionally we meet in our Local Records with notices of extraordinary takes of salmon, such as the following:—"July 15, 1771.—Upwards of 4000 salmon were exposed for sale in Newcastle fish market, which sold for about a penny-farthing a pound: 107 salmon were caught that morning at one fishery above Tyne Bridge."

Until the middle of last century none but persons free of some of the companies were allowed to carry on trade in the town. The following circumstance is, perhaps, the last trace of this custom. David Guthrie, who used to cut the hair of most of the present ancients of Newcastle, often said that his master was allowed to ply his avocation in the town only on condition of shaving all the freemen who applied to him gratis. "Cull Billy's" father was the first who fairly broke through the custom.

The use of female labour was not then so restricted as at present. At the beginning of this century, and for more than ten years afterwards, all the bricklayers' labourers were women. They boldly ascended the highest buildings, carrying bricks and mortar upon their heads. Women were also used in the market on the Saturday to carry the meat home. They could carry very great weights upon their heads. With greater propriety, women practised the lighter handicraft of the barber. Every day, at the close of last century, two female artists took up a position on the Sandhill, with a portable fire-place, and the usual apparatus of a barber. On a Saturday especially, they were busily employed in denuding the chins that presented themselves of the stubble that had gathered during the week. Their appliances were, however, not very complete, for the faces operated on went away, the lower part clean as soap and water could make them, the upper as black and grimy as before.

The travelling accommodations of the last century were

very different from what they are now. Mr. Cuthbert Teasdale, an attorney of the last generation, and generally known by the *sobriquet* of the honest attorney, was "admitted" in George the Second's reign. On going to London from Hexham, he bought a horse on which to ride; he spent thirteen days upon the journey, and sold his nag on his arrival in the city; no doubt to save its keep. In 1784 there was but one coach between London and Newcastle, which started at ten at night both from Newcastle and London, and stopped all night at Doncaster and Stilton in going up, and at Grantham and Boroughbridge on its way down. The journey between Newcastle and Edinburgh occupied two days. In 1786 a diligence ran between Newcastle and Carlisle, leaving Newcastle every Friday at seven o'clock, and arriving at Carlisle at one o'clock on the following afternoon. From Carlisle it returned on Sunday at one o'clock p.m., arriving in Newcastle at three p.m. on Monday (g). Before taking a journey to London, it was a usual precaution for the traveller to make his will. Mr. Fenwick tells me he remembers making a gentleman's will before he ventured upon a journey to Carlisle. The first time the writer went to Edinburgh, he left Newcastle at five o'clock in the morning, and arrived at his destination a little before midnight. On his first journey to London—in the mail—he left Newcastle at ten o'clock on the Monday morning, and reached the Bull and Mouth, Aldersgate Street, at six o'clock on Wednesday morning.

The conveyances between Newcastle and the towns in the neighbourhood call for little remark, except in the case of Shields. At the beginning of this century there was but one coach to Shields each day, which returned in the evening. The river was the highway that was most frequented; wherries went up and down as the tide suited, carrying goods and passengers. A fiddler was usually on board to entertain the company. Comfortables, a kind of covered passenger-boat, were afterwards introduced. The writer remembers

(r) See Mr. Hinde's paper on The Old North Road, in the Arch. Æliana, v. iii., p. 252.

spending three hours in a Comfortable in the passage down to Shields, and the same in returning. When ships arrived in Shields, it was necessary to communicate immediately with the fitters, in order to secure an early turn. In many instances the jolly tars, to whom the task of taking the intelligence was committed, had no other resource than to try their skill at horsemanship. This led to the establishment of Shields gigs, which stood for hire, and took the journey when a sufficient number of passengers was obtained. Two shillings was the fare. There was an almost total absence of street conveyances in the town. Hodgson, in his *Picture of Newcastle*, published in 1812, says—"Hackney coaches have never yet been established in Newcastle, but sedan chairs are much in use." Mr. Sopwith, in his *Guide*, written in anticipation of the visit of the British Association to Newcastle in 1838, says—"Hackney coaches are few in number, and occupy one stand only, viz., near St. Nicholas Church: cabs are yet unknown." At the present time there are 43 hackney cabs and carriages in Newcastle, and 14 in Gateshead—57 in all. A sedan chair is very rarely seen in the streets, though, probably, such a conveyance may be obtained.

The streets of Newcastle must have been dark and dreary during the long nights of winter. Until the introduction of street lamps, each passenger required to have a servant carrying a "link" or a lanthorn. The houses of the chief inhabitants were provided with extinguishers, beside the door, for putting out the links. One of these remained in the Bigg Market until recently. Oil lamps were introduced in 1763, but they were not lighted on the nights when the moon was expected to shine. If the old watchmen, calling the hours as they passed, relieved the night of some of its tediousness, they were not very efficient. They were only employed, moreover, during the winter months.

The educational advantages enjoyed by the inhabitants of Newcastle towards the end of last century were not great. The Royal Free Grammar School of Queen Elizabeth, after sustaining a distinguished reputation, and sending forth

many eminent scholars during a period of a century and a half, suffered a total eclipse under the great Grecian Dawes, who was appointed to the head-mastership in 1738. His intemperate habits and brutal manners far more than counter-balanced his genius and acquirements, and the school was all but deserted. The Corporation were obliged to purchase his retirement by a pension, when they were fortunate enough to secure the services of a successor, during whose long career the institution flourished far beyond its former fame.

The low state of mental culture in Newcastle previous to his appointment, and the extraordinary influence of this great schoolmaster in promoting social amelioration and refinement, is prominently noticed in the very curious autobiography of the Rev. Dr. Carlisle of Inveresk, who was a frequent visitor in the best circles of Newcastle society. "At this period," he says, referring to the year 1760, "there were not many conversable gentlemen in the town, for the men were in general very ill-educated, while the ladies who were bred in the south seemed to be very unequally yoked. The clergy at the same time were almost all underbred, there being only one Vicar in the town, and the rest only curates and lecturers; and had it not been for the ladies, the state of society would have been very disagreeable. For many years past it has been totally different; Mr. Moises, a clergyman, was now master of the Grammar School, and being able and diligent in his profession, soon made a great change in the young natives; insomuch that soon after there issued from it several distinguished characters, such as Mr. Chambers, I think, a Judge in India, or a Professor of Law at Oxford, and the two Scotts, Sir William and his younger brother, the Chancellor of England. Dr. Akenside was also a native of Newcastle, and had studied physic in Edinburgh in the years 1744-5. As he was of low descent, his father being a butcher, he stole through his native town *incog.* as often as he had occasion to pass, and never acknowledged his relation to it." It should be noted that Dr. Akenside was a pupil of Dawes, not of Moises. The want of a ladies' school, where anything more intellectual than needle-work, dancing, and

English grammar was taught, continued to be felt in Newcastle till about the year 1780, when the task of female tuition was undertaken by two highly accomplished sisters, Mrs. Hutchinson and Miss Hall. The latter, afterwards Mrs. Waters, continued to keep a school for some years within the present century, and by her were educated a large proportion of the ladies, as well of Northumberland as of Newcastle, of the generation whose ranks are so rapidly thinning amongst us. Miss Wilson, a talented and intellectual lady, had a large school in Ellison Place; she died in 1806.

Dr. Carlisle afterwards somewhat modified his opinion of the clergy of the town—"two or three of them could be endured, for they played well at cards, and were not pedantic." "Sometimes," he says, "a neighbouring clergyman, of university education, accepted a lectureship for the sake of living in town in the winter, though the salaries were no more than £100." Dr. Carlisle was the brother-in-law of Alderman Blackett, whom he describes as "but a dull man, and his cousin Sir Walter no better, though rich, magnificent, and generous. The company about them were not very agreeable; some of the bucks had humour, but they were noisy and illiterate."

At an early period the Corporation contributed to the education at the universities of tradesmen's sons, with a view to their entering the Church, and supplying the several small cures in Newcastle. Dr. Jennison, the Vicar of Newcastle, under the Commonwealth, lauds their generosity in this respect—"Such yearly maintenance, allowed so many young students of your own town (whose need may require it) for the ease of their charge at the universities, till seven years study have enabled them to provide and care for themselves; so that you have at this hour now living of such as are bred and born in this your town, eight preachers, of gifts competent at the least, all whom you well approve of." This yearly maintenance, however, was but a pension of £5 a-year, which, however considerable it might be in the days of Vicar Jennison, soon

ceased to be any great help towards the expenses of a university education, and was ultimately discontinued. Brand expresses his regret that the amount had not rather been increased. His precursor, Bourne, is said to have been one of the last recipients.

The educational opportunities of the poorer classes of the community were very inadequate. Each parish had endowments, by which a certain number of poor scholars were clothed and educated; but these were by no means equal to the wants of the community. It was not until the year 1810 that the Royal Jubilee School was founded, the first of those admirable institutions, many of which have been established since, that give a plain but useful education, either altogether gratuitously, or at a small price, to all comers.

In referring to the manners of our grandfathers, we must not forget that a rough exterior is not incompatible with sterling integrity and true greatness of mind.

Stukeley, when he was in Newcastle in 1725, made the following note respecting the dialect of the inhabitants:—"They speak very broad; so that, as one walks the streets, one can scarce understand the common people, but are apt to fancy one's self in a foreign country." For a century afterwards, matters in this respect continued nearly stationary. Lord Eldon had the "burr" in perfection, which he could not help displaying when, as the head of his Majesty's Commission, he was called on to *prorogue* Parliament and declare it "prorogued accordingly." But since his day education and steam have made great inroads upon the vocabulary and pronunciation of the people of Newcastle. Our manly Doric will soon be a thing of the past.

In the picture of the Sandhill, already referred to, we have an insight into the manners of the people. Two men, stripped to the waist, are engaged in a regular fight. Near the salmon fish market are some women mauling each other, to the great satisfaction of the onlookers. The gentlemen in the foreground of the picture—the magnates of the town—seem to take all as a matter of course.

John Wesley, in his Journal, gives us some glimpses of

the state of the lower orders in Newcastle, and at the neighbouring collieries in his day. His first impressions were not favourable. "Friday, May 28th, 1742.—We came to Newcastle about six: and, after a short refreshment, went into the town. I was surprised: so much drunkenness, cursing, and swearing (even from the mouths of little children,) do I never remember to have seen and heard before, in so small a compass of time. Surely this place is ripe for Him who 'came not to call the righteous, but sinners to repentance.'"

He gives us the following picture of a pit village—Plessy—"ten measured miles north of Newcastle," which he visited on Good Friday, 1743. "It is inhabited by colliers only, and such as had been always in the first rank for savage ignorance and wickedness of every kind. Their grand assembly used to be on the Lord's day; on which men, women, and children met together, to dance, fight, curse and swear, and play at chuck, ball, span-farthing, or whatever came next to hand. I felt great compassion for these poor creatures, from the time I heard of them first; and the more, because all men seemed to despair of them." Things were no better in the neighbouring county. "8th March, 1743.—In the afternoon I preached on a smooth part of the fell (or common) near Chowdon. I found we were got into the very Kingswood of the north. Twenty or thirty wild children ran round us, as soon as we came, staring as in amaze. They could not properly be said to be either clothed or naked. One of the largest (a girl, about fifteen) had a piece of a ragged, dirty blanket, some way hung about her, and a kind of cap on her head of the same cloth and colour. My heart was exceedingly enlarged towards them; and they looked as if they would have swallowed me up; especially while I was applying these words—'Be it known unto you, men and brethren, that through this man is preached unto you forgiveness of sins.'"

There is another side to this picture—the extreme eagerness of the people to hear his message, and the warmth of their feelings to him. "Sunday, 30 May, 1742.—At seven I

walked down to Sandgate, the poorest and most contemptible part of the town; and, standing at the end of the street, with John Taylor, began to sing the 100th Psalm. Three or four people came out to see what was the matter, who soon increased to four or five hundred. I suppose there might be twelve or fifteen hundred before I had done preaching, to whom I applied the solemn words, 'He was wounded for our transgressions, he was bruised for our iniquities: the chastisement of our peace was upon him; and by his stripes we are healed.' Observing the people, when I had done, to stand gaping and staring upon me, with the most profound astonishment, I told them, 'If you desire to know who I am, my name is John Wesley. At five o'clock in the evening, with God's help, I design to preach here again.' At five, the hill on which I designed to preach was covered, from the top to the bottom. I never saw so large a number of people together, either in Moorfields, or at Kennington Common. . . . After preaching, the poor people were ready to tread me under foot, out of pure love and kindness. It was some time before I could possibly get out of the press." He was "vehemently importuned" to stay with them, "at least a few days; or, however, one day more;" but he could not, as he had pledged his word to be elsewhere.

There cannot be a doubt that the efforts of John Wesley and his followers have contributed very greatly to the improvement of the manners and the morals of the inhabitants of the coal-field of the north of England.

The following sentences are taken from the Life of Lord Chancellor Eldon. They give us a little insight into the manners of the youth of the upper class of society toward the end of last century, but it would be unfair to draw too general a conclusion from them. "I do not know how it was," says Lord Eldon, "but we always considered robbing an orchard as an honourable exploit. I remember once being carried before a magistrate for robbing an orchard; 'boxing the fox,' as we called it. There were three of us, Hewit Johnson, another boy, and myself. The magistrate acted upon what I think was rather curious law, for he fined

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our fathers each thirty shillings for our offence. *We* did not care for that, but then *they did*: so my father flogged me, and then sent a message to Moises, and Moises flogged me again. We were very good boys, very good, indeed: we never did anything worse than a robbery. We used, when we were at the Head School, early on the Sunday mornings, to steal flowers from the gardens in the neighbourhood of the Forth, and then we presented them to our sweethearts. Oh! those were happy days—we were always in love then.” The young people of the present day have their own feelings, but whether it is that there are no flowers and apples to steal, or that the police are more efficient, or better principles prevail, one thing is certain, any youth would be ruined for life who should, now-a-days, follow Lord Chancellor Eldon’s example.

The amusements of the people were much less diversified formerly than they now are, and their seasons of relaxation fewer. The fete days in Newcastle used to be the Barge Day, the King’s Birthday, Race Thursday, and Assize Saturday.

The Corporation, as conservators of the Tyne, made an inspection of that part of the river over which their jurisdiction extended annually, on Ascension Day. The Mayor and his friends embarked at an early hour in the morning, at the Mansion House, in his own barge, and rowed down to Shields. The Master and Brethren of the Trinity House accompanied them, in their barge. Every boat on the river was pressed into service for the occasion, and one vied with another in the brilliancy of its decorations. The sight was an exceedingly pretty and animating one, and the people who lined the banks, on both sides, added to the merriment of the occasion, by firing innumerable guns, of every size and description; and, if the Mayor were popular, by loudly cheering him as he passed. In the afternoon the procession went up the river as far as Hedwin Streams, about 2 miles above Newburn. On returning in the evening, the party alighted at the King’s Meadows, and various sports were engaged in, such as rowing, leaping, ass races, running in

sacks, and grinning for tobacco. Ale and porter, gingerbread and nuts, were pretty freely distributed. As at every halting place it was thought necessary to partake of some refreshment, the labours of the corporate party were usually very severe. The mass of the community, who simply looked on, enjoyed a pretty sight, and a holiday at a pleasant season of the year. The introduction of steamboats, and their interminable clouds of smoke, injured the effectiveness of the scene, and the transference of the conservatorship of the river from the Corporation to the River Tyne Commissioners rendered the joyous barge days of the last generation a thing of the past.

The loyalty of the people during the long French war was unmistakable. Thompson, in his famous local song of Canny Newcassel, correctly represents the Newcastle keelman, on a visit to London, as willing to die for his king, at the same time that he cannot shake off his local partialities. He is looking at St. James's Palace, when George III. makes his appearance—

Ah, hinnie! out com the King while we were there,
His leuks seem'd te say, "bairns be happy!"
Sae down o' my hunkers aw set up a blare,
For God to preserve him frae Nappy.
For Geordy aw'd dee—for my loyalty's trig,
And aw own he's a geud-leukin mannie;
But if wor Sir Matthew ye buss iv his wig,
By gocks! he wad leuk just as canny.

Accordingly, the King's birthday—the 4th of June—was generally kept; and when there was a review upon the Town Moor, as there generally was, the whole population turned out to give it their sanction.

The races were exceedingly popular. All the gentry of the surrounding country flocked into the town. Such a display of handsome equipages as were to be seen going up Northumberland and Percy Streets on a Race Thursday, is never witnessed now in Newcastle. The number of people that attended the races, considering the limited means of conveyance, was enormous. On June 25th, 1753, the first

time the King's Plate was run for, it is said that there were 50,000 persons on the Moor. At present, during the race week, nearly all the inhabitants of Newcastle who are able, fly the town, and, though great numbers of people from various parts of the country are to be found upon the race course, the upper classes are feebly represented.

The Assizes were held but once a year, and the Judges uniformly came into town on a Saturday. On that day the Sheriff of Northumberland met the gentry of the county and the principal inhabitants of the town at an early dinner, in aid of the Newcastle Infirmary. An adjournment was then made to the Moot Hall, to take wine, and when the time approached for the reception of the Judges, the Sheriff, on horseback, with pages at his side, and a brilliant array of horsemen and carriages, proceeded to Sheriff Hill to escort the Judges into town. The Sheriff's carriage, for the use of the Judges, was always drawn by six horses, and was accompanied by outriders and trumpeters. The Mayor and Sheriff of Newcastle, in their robes, accompanied by the magnates of the town, met the Judges on Tyne Bridge, to give them a hearty welcome. On the Sunday there was a procession to St. Nicholas Church, and that vast fabric was filled with people. Of course, when so brilliant a spectacle was to be seen, the people were there to look on. Respect for the law, and reverence for the functionaries to whom the dispensing of justice was confided, was promoted. All this is now matter of history. The Judges arrive at the Central Station, by train, like other people, and the ticket porter stands in no fear of committal when he proceeds to satisfy himself that Her Majesty's Judges of Assize have paid their proper fare. The Sheriff, no longer accompanied by the gentlemen of the county, meets them at the station, and usually has for their accommodation, a state carriage drawn by two horses.

The cruel sport of bull-baiting had nearly ceased at the time we are speaking of. On Jan. 21st, 1768, Sykes tells us, a fine bull was baited on the Sandhill, which, with some others, was bought by a subscription of several gentlemen, and ordered to be killed and distributed to the poor. A few

days afterwards, another bull was baited in the same place, when a young man, a sailor, venturing too near, the bull caught him with his horns, and gored him in such a manner that he died next morning. Several other people were seriously maimed. A few days after, the bull ring was removed by order of the magistrates, in consequence of the repeated accidents which had happened. In 1774, a bull was baited on the Moor, in honour of the anniversary of the termination of the dispute between the Corporation and the Freemen about the letting of parcels of the Town Moor for improvement. In some of the neighbouring towns the practice existed for some time after this. In 1822, a bull was baited on Cullercoats sands; and at about the same period several were baited at Sunderland.

It is certain that cock-fighting was a favourite pastime of the inhabitants of Newcastle from an early period. Even during the Commonwealth, when all public amusements were rigorously interdicted, if we are to credit tradition, a cock-pit flourished at the Westgate, just outside of the corporate jurisdiction. As early, at all events, as 1712, we have an advertisement of cock-fighting in this locality, at the Crown, without the Westgate, contemporary with which was a cock-pit at Dunstan Bank. Shortly afterwards, we find "covered cock-pits" attached to many of the principal inns in Newcastle, the arena in those of earlier date being uncovered. At first, the sports were carried on at very short intervals throughout the season, but by degrees the principal attendance was concentrated in the race week, when the fighting was introduced under more imposing auspices, the *gentlemen* of Northumberland appearing as the competitors of the *gentlemen* of Durham, of Cumberland, or of Yorkshire. "Gentlemen" is rather an elastic term; but the "mains" fought between individuals show that the pastime was then patronised by persons of the highest rank and station, up, at all events, to the close of the last century, without any impeachment of their refinement or humanity.

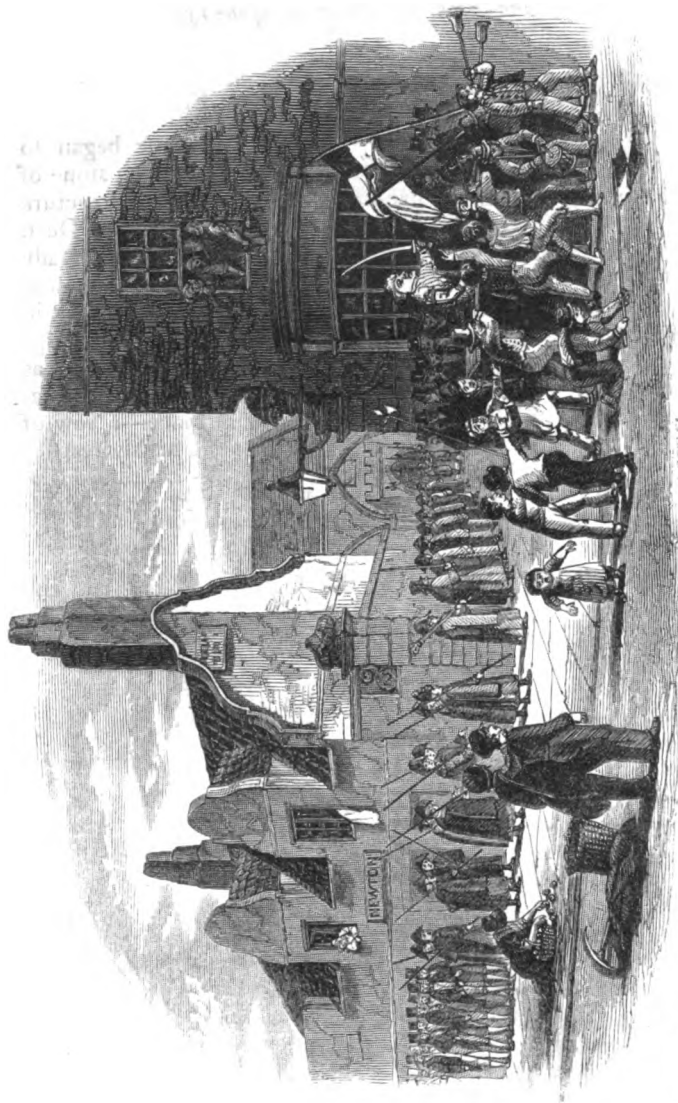
Amongst the competitors in the Newcastle cock-pit were the Duke of Hamilton, Sir Harry Liddell, General Beck-

with, Captain O'Callaghan, Mr. Fenwick, of Bywell, Mr. Brandling, &c. In 1790, a "long main" was fought at Hexham, between the Duke of Northumberland and Mr. Fenwick, and another main the same year at Alnwick, between the Duke of Northumberland and Charles Grey, Esq. (the late Earl Grey), jointly, and Mr. Fenwick.

With the commencement of the present century the taste for cock-fighting began to decline; and in this district, after the death of Sir Harry Vane in 1813, the sport was in a great measure left in the hands of persons of a very different class in society.

Amongst the holidays of the olden time may be reckoned the Monday after Michaelmas-day. On this day the Mayor, Sheriff, and other officers for the year were chosen. The process of election was a somewhat complicated one. The different mysteries elected electors, and these again elected others. The by-trades added their quota to the electoral body. When at length, after a seven-fold operation, the 24 persons were selected, the majority of whose voices was to bestow the high official dignity, they went in solemn procession to the Hospital of our Lady, in the Westgate, in the church of which the election was to take place. The woodcut represents the grave and reverend signiors on their way to discharge their very responsible function. The business of the Royal Free Grammar School was conducted in this church, consequently the Monday next after Michaelmas-day was a holiday for the boys. And why should not these boys, released from their tasks, elect a mayor too? The picture shows us that they have already done so; and so far as fun goes, they certainly have the best of it. Such were the scenes that were enacted on the Monday next after Michaelmas.

Christmas followed not long after with its waits, yule doos, carols, sword-dancers, and festivities, and so brought the year to an end. The waits and paste dolls (perhaps intended for a figure of the child Jesus or the Virgin Mary) have gone into oblivion, and though an attempt has been recently made to revive the practice of sword-dancing, it is felt to be unseemly, and unfitting the present age.



From an Engraving by Walker.

May-day Monday.—Electon of May in the Green time.

MODERN NEWCASTLE.

TOWARDS the close of last century, Newcastle began to exhibit some signs of expansion. The foundation stone of the Assembly Rooms, a handsome and commodious structure in Westgate Street, was laid in 1774. The origin of Dean Street, Mosley Street, and Collingwood Street has already been stated. In the upper part of the town, Saville Row was formed. It shoots off from Northumberland Street in an easterly direction. It took its name from Sir George Saville, who during the years 1776 and 1777 resided here as Colonel of the 1st Battalion of the West York Militia. After the erection of this street—Ellison Place—a row of large and commodious houses, named after the highly respected family to whom the ground belonged—continued the line of buildings still further to the east. A new theatre was, at considerable cost, reared in Mosley Street, and was opened in 1788.

County Courts.—In 1810, the foundation stone of the County Courts in the Castle Garth was laid by the late Duke of Northumberland, then Earl Percy. These courts cost the county the large sum of £52,000. They are very substantially built. The south front has a very imposing appearance, as seen from the Tyne Bridge. (See the frontispiece.) The architectural details of the building are taken from the Temple of Theseus at Athens. The internal arrangements of these courts are equal to, or perhaps superior to those of most others; still, the accommodation afforded to the public is of a very inferior character. The grand jury room contains a splendid full-length portrait of the late Duke of Northumberland, painted by Phillips. An admirable engraving of it was executed by Mr. F. F. Ranson, a native of Newcastle.

In 1812, the New Bridge was built, in order to form a new road to Shields.

In 1823-8 the present gaol was erected at a cost of £35,000. In order to adapt it to the present requirements

of the community a further sum of £15,000 has recently been expended upon it. No one can look upon the site occupied by this prison without regretting that so important a building should have been placed in so low and confined a situation. The present arrangements of the gaol are good, and its discipline effectively carried out by Mr. Robins, the governor. The average number of criminals confined in it during the year ending Sept., 1862, was 177; the largest number on any day during that period 214, the lowest 148. The earnings of the prisoners during the year was £685. The separate system is carried out, and the utmost order and quietness prevails within the walls.

In the north of the town several new lines of streets were formed about the same period. The ground between Percy Street and Northumberland Street, which had previously been occupied as a bowling green, was, in 1822, sold for building purposes. Prudhoe Street and Prudhoe Place, with their contiguous courts, were built upon it. The style of building here adopted is very unsatisfactory. A noble opportunity was lost of improving the north entrance into the town. Near the Barras Bridge, Lovaine Row and Eldon Street were formed.

Up to this period nearly all the houses in the town were built of brick, with the exception of the three already named. In 1823, Mr. John Baird, an eminent surgeon, broke through the established precedent, and built the two houses, which now form Nos. 37 and 39, Northumberland Street, of stone. About the same period Mr. Todd built Picton House, at the end of the New Bridge, of polished stone, taking the utmost care that the finest blocks should be selected from the quarry.

Mr. Grainger.—In the subsequent development of the town, Mr. Richard Grainger took so prominent a part, that a glance at his career is here necessary. Under the head of "Newcastle Improvements" a series of articles appeared in the Penny Magazine for the year 1840, in which the character and exploits of Mr. Grainger are ably narrated. This account is understood to be from the pen of Miss Martineau,

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who derived much of her information from Mr. Fenwick, of Newcastle, who had known him intimately from the commencement of his career. Mr. Grainger was born in High Friar Street, at the close of last century. The house in which he first saw the light, and which is opposite the back door of the Dispensary, has this year undergone the process of "restoration." It was a low two-storey house. The walls were about $3\frac{1}{2}$ feet thick, and were composed of rubble, set in clay, or rather in dirt gathered off the street. His parents were poor, and they only occupied the lower part of the house. The ceiling of this storey was not more than 5 feet high. Grainger received his education at St. Andrews' Charity School, the boys of which in that day wore bright green long-tailed coats and leather breeches. He served his apprenticeship with a respectable house-carpenter and builder of the name of Brown. He enjoyed no special training for the great enterprise in which he was to engage. Any carpenter's or bricklayer's apprentice has as good a start in life as he. He proved himself to be possessed of talents of a high order, and to these he added persevering industry. His mind was a well balanced one, and his temper calm. He was never in a hurry, never angry, never in an absent mood, and he never passed the humblest of his friends in the streets without noticing them. It was his happiness in early life to be brought under the controul of religious principle. In marrying Miss Arundale he obtained an invaluable helpmeet, he improved his position in society, and he became possessed of a capital of £5000. His first work was rebuilding, along with an elder brother (who shortly afterwards died), the house in High Friar Street, next the one in which he was born. He now came under the notice of Mr. Batson, and was employed in building some of the houses in Higham Place. He erected nearly the whole of the east side of Carliol Street, and the whole of Blackett Street, except eight houses. Eldon Square, which is built of stone, was chiefly his work. It was begun in 1826. Leazes Terrace was his next undertaking. This consists of 70 large stone houses, which exhibit architectural features



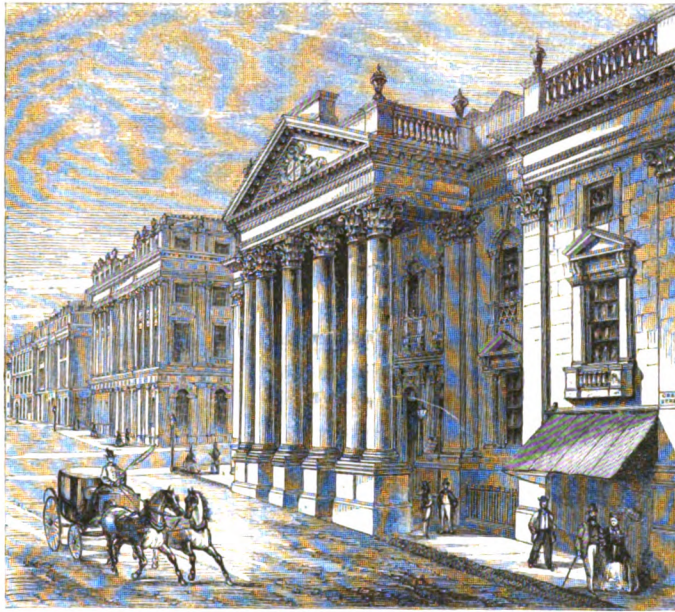
The late Richard Grainger, Esq.
From a Photograph from Life, taken June, 1858.

that had not been attempted before in Newcastle. The Arcade, opposite the east end of Mosley Street, was his next important effort. Great taste is displayed in its construction, and it was much admired at the time it was built, but it labours under the disadvantage of having a bad exit at the lower end. The Post Office is situated at the foot of the Arcade. All these enterprises prepared him for the great work in which he was now to engage. In 1832 he succeeded in purchasing, for the sum of £50,000, Anderson Place and the contiguous grounds. This it will be remembered is the house in which Charles I. was confined. The ground consisted of more than 12 acres in the very heart of the town. As the Lorke Bourn, however, ran through it, it was very uneven. A great street by which direct communication might be opened between the upper part of the town and Dean Street at once dawned upon Mr. Grainger's mind. There were, however, serious obstacles in the way. The chief of these were that the New Butcher Markets belonging to the Corporation, and the Theatre belonging to a private company, blocked up the line. These serious difficulties were overcome. The streets were planned, and the ground was levelled, at enormous cost. Amongst the first buildings to be completed were the New Markets and the Theatre.

The Butcher and Green Markets.—The Market was opened October 24th, 1835. It occupies an area of two acres, and, both as regards its architectural features and the convenience of its arrangements, is believed to be the finest in the kingdom. The display of meat in it on a Saturday forenoon, especially during the spring months, is perhaps unequalled. The Green Market is a spacious and handsome structure, 318 feet long, 57 feet wide, and 40 feet high. It is provided with two fountains which, however, seldom play, the splashing of the water being inconvenient to the market people and their customers. An extensive wholesale market for fruits and vegetables is held in the streets surrounding the Market, early in the mornings of market days.

The Theatre.—The Theatre is the chief ornament of Grey Street. Its lofty portico projects over the foot-path,

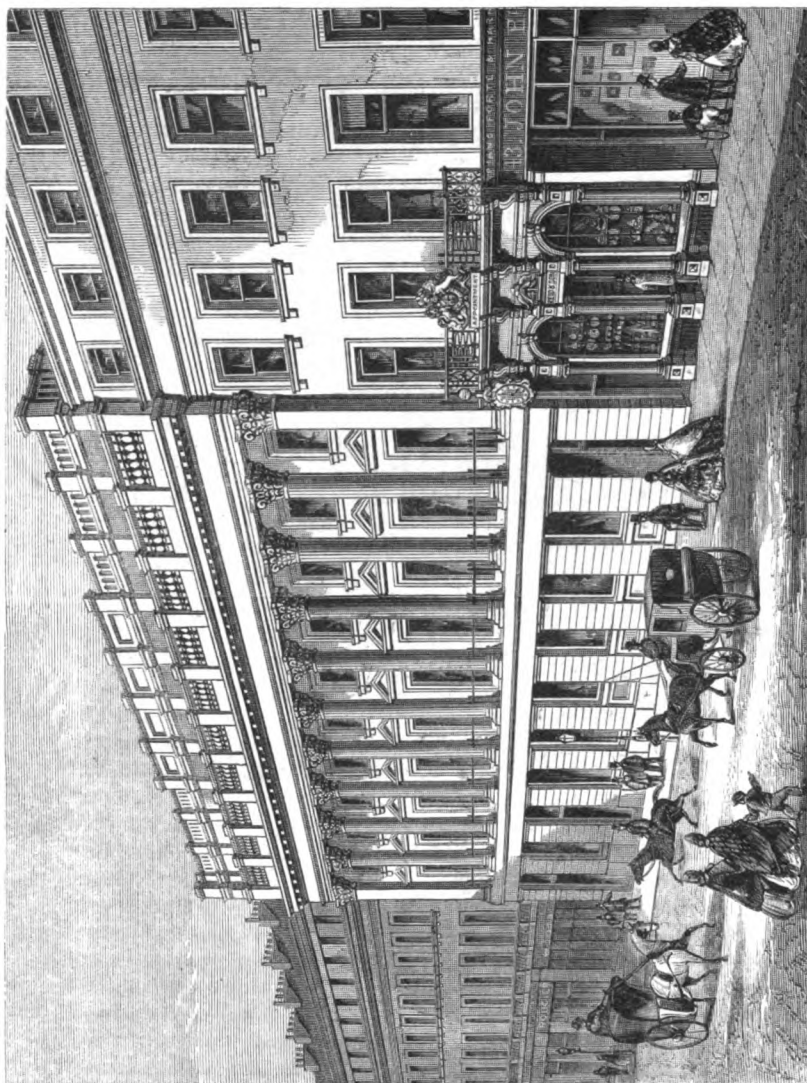
and consists of six Corinthian columns, placed upon pedestals, and these are surmounted by an enriched pediment bearing the royal arms. The design is taken from the Pantheon at



Theatre Royal.

Rome. The interior of the theatre is spacious and commodious, and well adapted for the transmission of sound. Its position is ingeniously arranged so as to avoid the exhibition of blank walls, and to obtain the support of the contiguous buildings.

The New Streets.—Grey Street is the handsomest street in the town, and few streets in any town or city in the empire can vie with it. The building occupied by the Branch Bank of England is the chief feature on its west side (which is shown in the woodcut on the next page).

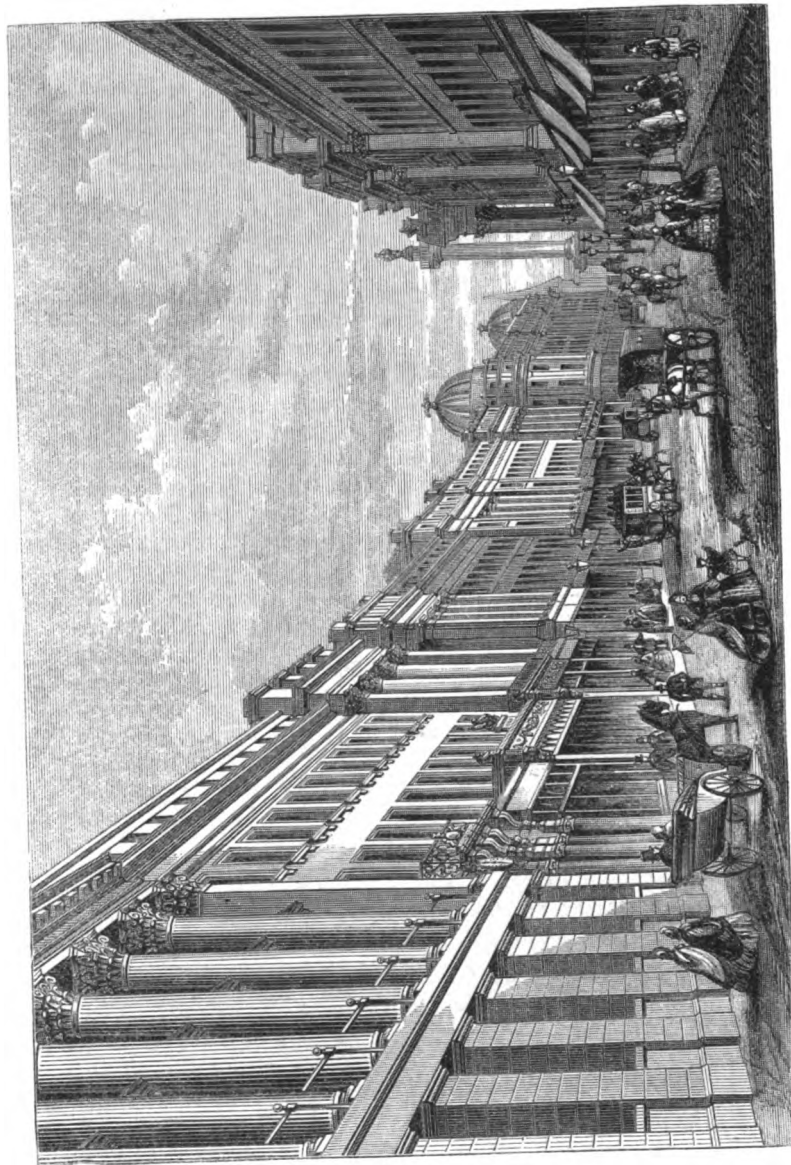


Bank of England.

The lower storey of this stately pile, consists of rustic masonry, on which, stand nine Corinthian columns and two pilasters; these again support an entablature, finished with a double row of balustrades. Nearly opposite to the Bank, on the eastern side, is a building whose chief feature consists of a recessed range of lofty fluted columns of the Corinthian order. Other prominent features will attract the attention of the visitor. Variety as well as elegance characterizes the architecture of the street, and in attaining this, some of the chief structures of ancient Greece and Rome have been laid under contribution. Its plan being curvilinear, lends to it additional grace.

Near the top of it is a monument to Earl Grey, a noble Northumbrian, who was Prime Minister at the time of the passing of the Reform Bill. Now that this measure has ceased to be a question of party politics, and become a matter of history, few will deny the benefits conferred by it on the country. But whatever may be thought upon this subject, every Englishman must rejoice in another measure effected during the administration of Earl Grey—the emancipation of the slaves in the British colonies. Recent events in America show us the vast political importance of this step. Most humiliating would Britain's position now be if she had a single slave in any of her dominions. Grey's column was intended to be higher than it is, but its architects, Messrs. John and Benjamin Green, were compelled to subject the proportions of their work, not to the rules of art, but to the extent of the subscription list. The statue on the top—an admirable likeness—is by Bailey. The monument is seen in the general view of Grey Street, given on the next page, as well as in a subsequent view of Market Street.

Central Exchange and Lambton's Bank.—Two more buildings at the head of Grey Street require to be named. The Exchange is a triangular block of building. Being skirted by three streets, it has three fronts, which are uniform in design. They are of the Corinthian order, designed after the temple of Vesta at Tivoli. The three points of the triangle



Front View of City Street.

are finished by domes springing from ranges of Corinthian columns. The handsome area in the interior of this block of building was intended for a corn market. It is spanned by a roof of bold conception, which throws a mass of light into the interior. Mr. Grainger offered to make a present of the market to the town, if the Corporation would accept of it and devote it to the purpose for which it was intended. The Corporation declined the offer, and Mr. Grainger devoted it to the purpose of a news-room and general exchange. It is probably the handsomest news-room in the kingdom—certainly it presents greater novelty of design than any other. On the opposite side of Grey Street, from the Exchange, is a building now occupied by Messrs. Lambton & Co., bankers. It is one of the architectural ornaments of this ornate part of the town. Mr. Grainger entertained the idea, if he could have obtained the acquiescence of the Newcastle Corporation and County Magistrates, of erecting between Hood Street and Market Street, a series of buildings in which the Assizes for the town and county should be held, and which should supply a residence for the Judges, and apartments in which the Mayor might, during his year of office, transact public business and give his official entertainments. The County Magistrates gave their consent to the proposal; but the Town Council hesitated so much, and delayed their response so long, that Mr. Grainger withdrew his proposal, and devoted his ground to other purposes. Parts of the design prepared for the proposed new courts were made use of in the building recently occupied by the District Bank, and now by the bank of Messrs. Lambton & Co.

In addition to Grey Street, Mr. Grainger constructed Grainger Street (of which a drawing appears on the other side) and Market Street, which are little inferior to Grey Street. He also built Clayton Street, a street which, if less ornate than those now named, is not less useful, it being now one of the great thoroughfares connecting the town with the Railway Station, and with the populous and quickly-increasing suburbs to the west. Nun Street, Nelson Street, Hood Street, and Shakespere Street are short streets

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GRANGET STREET

(From a Photograph by Widen.)

connected with the main cluster. The whole of these streets present a front of polished stone. It has been estimated that the total value of the buildings planned and constructed by Mr. Grainger in five years, is about a million of pounds sterling, and that, during a great part of this time, about two thousand persons were engaged upon them.

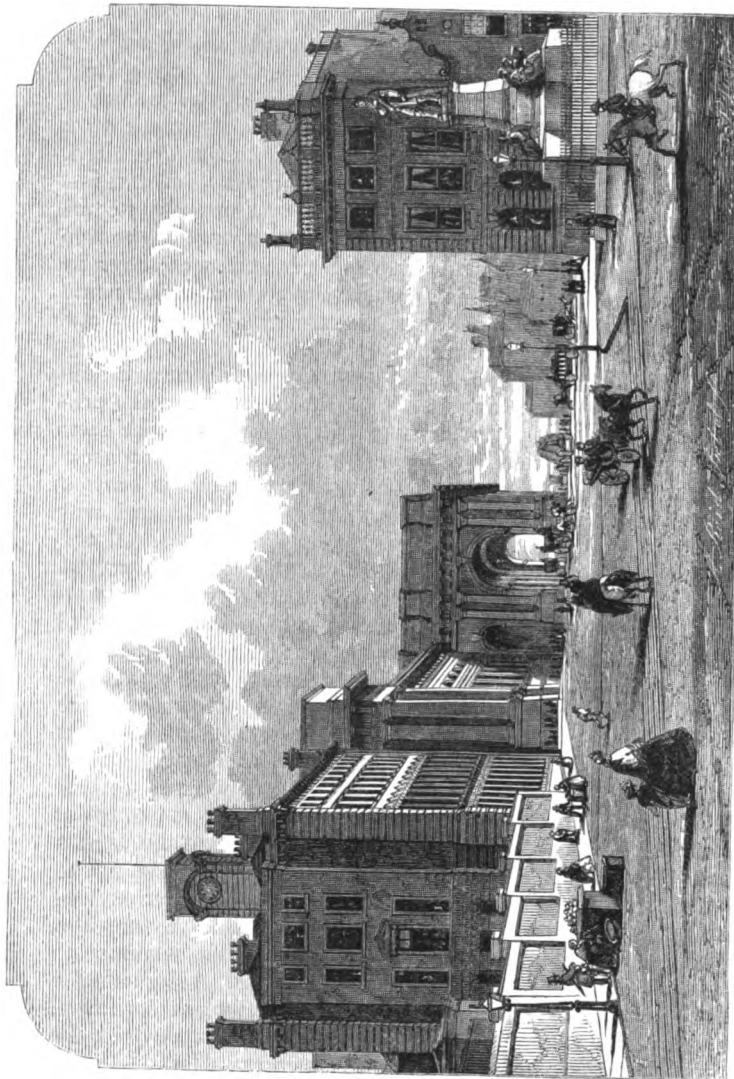
Mr. Grainger purchased a large estate in the west of the town—the Elswick estate—and contemplated extensive building operations in that direction. On one occasion, when urged by his early friend and legal adviser, to proceed more cautiously, he said, “I will not stop until I have made Elswick Hall the centre of Newcastle.” He did not succeed, however, in carrying out these plans to any great extent. He had built large houses more rapidly than occupants for this class of property could be found. The west end of Clayton Street, Hood Street, and some of the more retired streets had, for a few years, a very desolate aspect. The whole of Mr. Grainger’s property is now occupied, and it will, no doubt, gradually increase in value. That his speculations were founded on sound principles there can be little doubt, but that like other men of ardent minds, he moved too impetuously, seems to be equally true. He died somewhat suddenly, 4th July, 1861, at the age of 61 years. The whole town bewailed his departure.

In connection with the improvements of Newcastle, especially those of Mr. Grainger, one name cannot be overlooked—that of Mr. Clayton. A native of the town, and a member of a family that for several generations has taken a prominent part in its affairs, he feels a personal and an hereditary interest in its welfare. To his wise counsels and powerful aid Mr. Grainger was much indebted, and in him every well-considered scheme for the improvement of the town has a friend and advocate.

Whilst Mr. Grainger was proceeding with so much ardour and success, other men were not idle. On the north of the town, Brandling Place and Village sprung into being. Nearer the town, on the north road, some handsome rows of houses were built by Mr. Ald. Dodds and Mr. Burnup.

On the east, numerous streets of houses suited to the wants of the humble yet respectable classes of the community, were built by Mr. G. T. Gibson. In the west—along Scotswood Road and by the side of Westgate Street—street seemed to be added to street, as if by the wizard's art. And they still continue to spring rapidly into existence. Blenheim Street and Blandford street are amongst the first that were built; a row on Ryehill, and the East Parade and West Parade are of later construction, and show how taste and comfort may be combined in houses of moderate cost and size.

Stephenson Bridge and Railway Station.—Some years before the development of the railway system, Mr. John Green, of Newcastle, published a scheme for crossing the river at a high level, so as to save the toilsome, and in some respects dangerous, descent and ascent on each side of the river. His plans did not meet with the approval of the monied part of the community. When the railways had nearly stretched, both on the eastern and western side of the island, from London to Edinburgh, it became evident, that unless the eastern lines could carry their passengers without a break in the journey, the western lines would command the through traffic. The crossing of the Tyne at Newcastle, at a high level, appeared however, so formidable, that at one time the railway authorities seriously contemplated leaving Newcastle out of their direct route and crossing the river in the vicinity of Bill Point, some miles below Newcastle. The genius of Robert Stephenson overcame all obstacles. An iron bridge, supported upon stone piers, was devised, which should at once meet the requirements of the railway company, and serve, at a slightly lower level, for the transference of ordinary traffic between Newcastle and Gateshead. This bridge consists of six cast iron arches, supported upon piers of solid masonry. The length of the viaduct is 11,337 feet; length of the waterway, 512 feet; the height of it from highwater mark to the line of railway, 112 feet; and to the carriageway, 85 feet. The first permanent pile for forming the foundation of the bridge was driven into the river on



The Station and Stephenson Monument.

October 1st, 1846, and the last key, closing the arches, was driven into its place on June 7th, 1849. The bridge was brought into ordinary use on the 4th February, 1850.

The cost of the bridge itself was £243,096; the cost of the approaches to it, £113,057; the cost of the land required, £135,000, making a total—for getting through Newcastle—of £491,153—or nearly half a million. The railway company are allowed by act of parliament to charge at the rate of three miles for carrying a passenger across the river by this bridge. Foot passengers pay a toll of a halfpenny when crossing by the roadway, and a carriage drawn by one horse is charged threepence.

The railway station is one of the most elegant and commodious in the kingdom. (The engraving on the previous page correctly represents it.) From it trains take their departure to the north, south, east, and west. It is a great advantage to the town to have all the railway *termini* centred in one spot. The building is of polished stone, and was designed by Mr. Dobson. In the choice of a style, the architect has followed the example of the ancient Romans, who, in their great works adapted the elegant designs of Grecian genius to existing circumstances. It was intended that the portico should have run along the whole of the front. Such a structure would have given an air of grandeur to the building, and been invaluable to the inhabitants as a place of promenade in wet weather. Unfortunately, a great depression in railway property took place before the station was finished, and this part of the design was suppressed. A portico upon a comparatively limited scale, and shorn of some of the artistic embellishments of the original design is now (August 20th, 1863) on the point of completion. The passengers' shed is most commodious, and covers an area of nearly three acres. The roof is composed of circular iron principals, divided into three compartments, and is supported on each side of the platform by metal columns. A large hotel is attached to the station, which has been furnished with all those appliances which modern ingenuity has devised for promoting the comfort of the way-worn traveller.

As the station is one of the finest in the kingdom, a visitor

to Newcastle may wish to be supplied with some details respecting its dimensions and its cost. The station covers an area of 19,300 square yards; of this space 12,600 square yards are devoted to the passenger shed, 3250 to the company's offices and waiting rooms, 1450 to the portico, and 2000 to the hotel. The length of the principal front of the station, exclusive of the hotel, is 593 feet 6 inches. The extreme length of the passenger shed is 614 feet 9 inches, and its width 184 feet. The portico is 211 feet long, 61 feet broad, and 58 feet high; it is roofed in one span. The whole cost of the station, portico, and hotel, has been £130,000.

In order to show the completeness of the arrangements at the station, it may be mentioned that 65 trains arrive at it and 66 depart from it daily. On the 24th of June last, the enormous number of 35,343 passengers were brought in and taken out of the station in comparative order and quiet, and the whole of this large body of passengers travelled on the North-Eastern Railway Company's lines without any irregularity or unusual detention. In order to ascertain the largest number of passengers arriving at the station, and taking their departure from it, in one day, the obliging superintendent of the local traffic, Mr. Eglington, has supplied the writer with the following table, the compilation of which has been the result of considerable labour. Although much of it does not bear upon our present subject, it is of too great value, for other purposes, not to be given entire.

Passengers Booked to and from the Central Station, Newcastle, during the three Race days, June 23rd, 24th, and 25th, 1863.

BOOKED TO NEWCASTLE—				1st class.	2nd class.	3rd class.	Total.
Tuesday	..	..	..	978	1,263	6,022	8,263
Wednesday	..	..	..	1,119	2,476	18,405	22,000
Thursday	..	..	..	516	1,783	9,280	11,579
Total	..	..	..	2,613	5,522	33,707	41,842
FROM NEWCASTLE—				1st class.	2nd class.	3rd class.	Total.
Tuesday	..	..	..	363	1,008	3,374	4,745
Wednesday	..	..	..	397	1,174	11,772	13,343
Thursday	..	..	..	488	1,529	16,273	18,290
Total	..	..	..	1,248	3,711	31,419	36,378

TOTALS FOR EACH DAY, IN AND OUT—

	1st class.	2nd class.	3rd class.	Total.
Tuesday	1,341	2,271	9,396	13,008
Wednesday	1,516	3,650	30,177	35,343
Thursday	1,004	3,312	25,553	29,869
Total for 3 days ..	3,861	9,233	65,126	78,220

The following Trains were run to and from the Central Station—

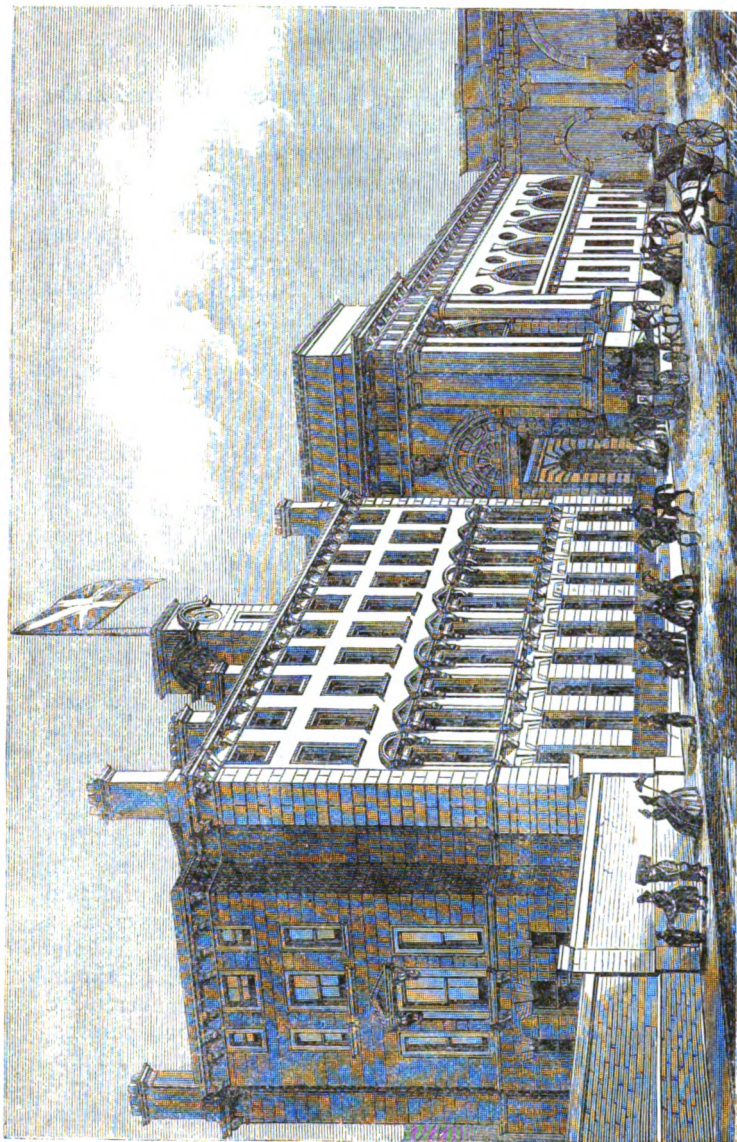
	Into Newcastle.	Out of Newcastle.	Total.
Tuesday	68	64	132
Wednesday	90	87	177
Thursday	85	85	170
Total	243	236	479

The undermentioned Carriages, of all Classes, were used to make up the Trains, and Engines in Steam to work the Trains.

	Carriages.	Engines.
Tuesday	254	43
Wednesday	410	56
Thursday	408	51
Total	1,072	150

These tables do not include the multitudes who came into Newcastle on the days in question by the river steamers, those who walked, or who used private conveyances. At the same time it must be borne in mind that a large proportion of the travellers on these days consisted of those who left the town to avoid the races, and returned in the evening.

The accommodation at the Station Hotel comprises more than 100 rooms, amongst which are suites of apartments for families and individuals desiring quiet. The coffee room is, with its adjoining reading and writing room, capable of seating 50 guests in separate parties with comfort. The first-class refreshment room is a room of noble proportions, elaborately adorned. Two hundred persons may readily be served in it at one time. Its chief faults are deficiency of light, and its distance from the landing platform. In order that the business of the hotel may be properly conducted, a staff of 50 servants is required. This hotel is said to be not inferior in any respect to the best metropolitan establishment. (The woodcut opposite represents it.)



Station Hotel and Railway Station.

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The Stephenson Monument is appropriately placed in the immediate vicinity of the station. George Stephenson stands upon a pedestal, at the base of which are four figures (of somewhat Grecian aspect) intended to represent the handicraftsmen of this mining and engineering district. The sculptor, Lough, wrought as a stonemason at the building of the library of the Literary and Philosophical Society. The cost of the monument was between four and five thousand pounds, which was raised by subscription.

The Town Hall Buildings.—For several years the corn market was held in the open air, in front of St. Nicholas' Church. In 1839, a covered market, formed on the site of some old houses, in the Groat Market and Flesh Market, was opened for the sale of corn. This market was chiefly promoted by persons interested in the property about St. Nicholas' Square, and who feared that it would suffer by the removal of the corn market elsewhere. The finances of the Corn Market Company were not sufficient to enable them to erect some ornate buildings which were contemplated, and without which an important site was left in a discreditable state. The Corporation eventually made arrangements with the Market Company, and took the market into their own hands. In 1855, the foundation stone of a new suite of buildings was laid by the Mayor, I. Lowthian Bell, Esq., which should be at once an ornament to the town, and a means of facilitating the transaction of public business. The estimated cost of the whole was £17,000.

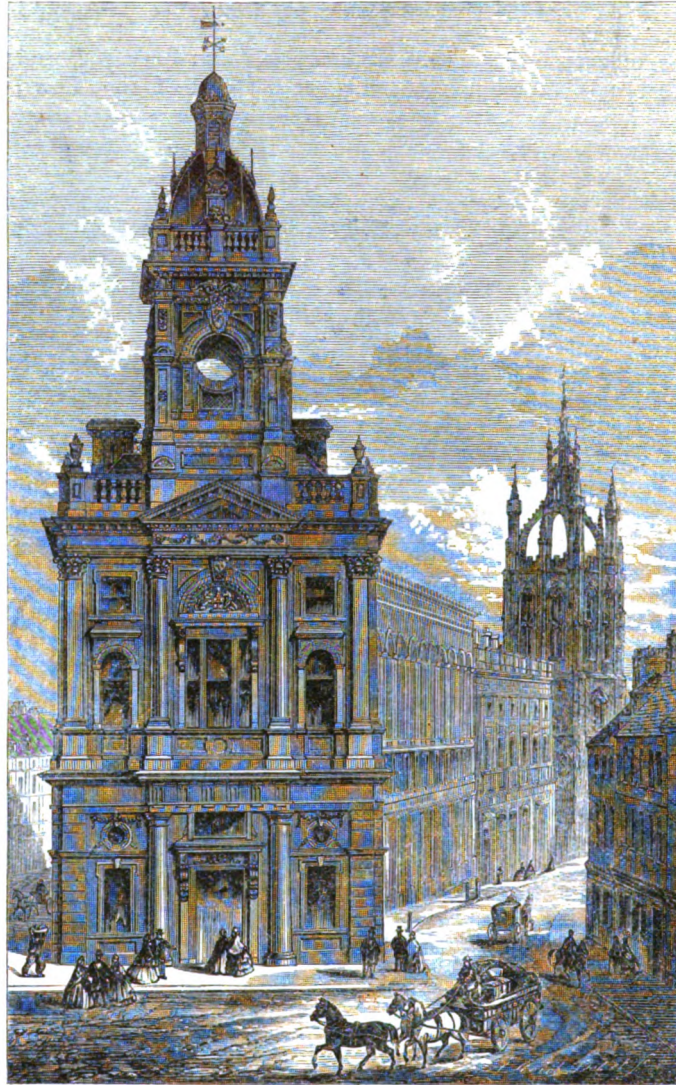
The buildings are now complete. At the northern extremity is a large hotel, surmounted by a neat spire. In the centre is the corn market, which, besides its professed design, is extensively used, especially on Saturdays, as a general exchange. To the South is the bank of Messrs. Hodgkin, Barnett, & Co., and several capacious shops. Above the corn market is a large hall used for concerts and public meetings. It is calculated to seat 3000 persons. A large organ has been placed in it at the cost of £2400. The other apartments in this storey are the chamber devoted to the meetings of the Town Council, committee rooms,

the offices of the Town Treasurer, Town Surveyor, and other corporate officials. The actual cost of the Town



Town Hall Buildings from the South.

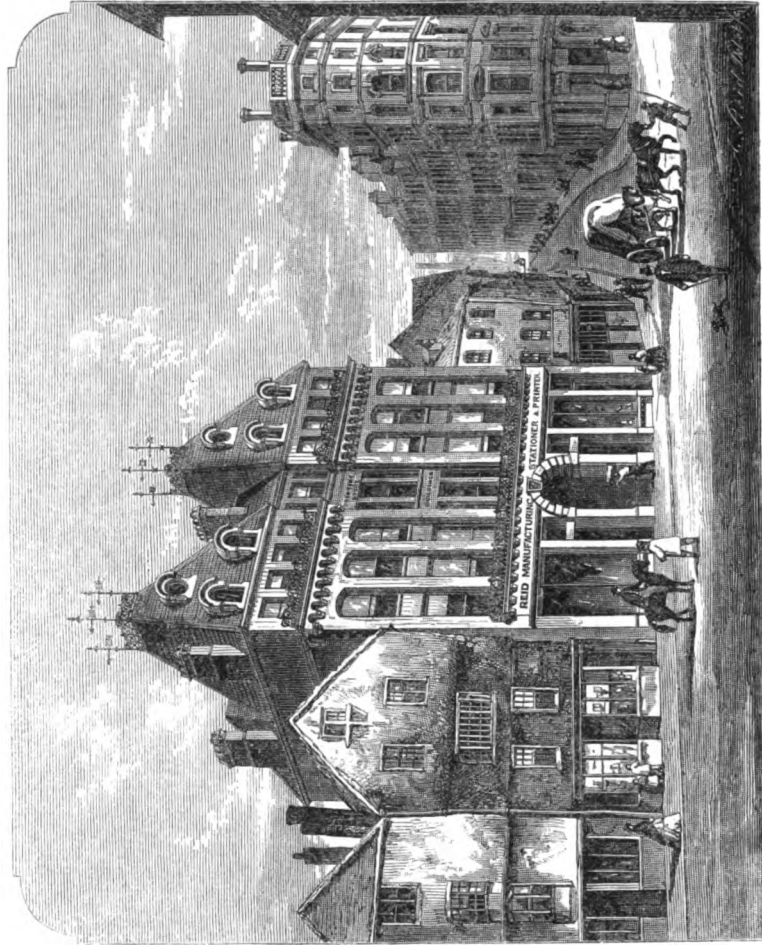
Hall Buildings—which are more extensive than was at first designed—is understood to be upwards of £50,000.



Town Hall Buildings from the North.

The most recently constructed buildings in Newcastle, are those in the vicinity of the Stephenson (High Level) bridge, and those occupying the space between the Butcher Bank and the Quay, which was rendered vacant by the great fire of 1854. These lines of street have been projected, and built by Ralph Walters, Esq., a native of Newcastle, who long practised as an attorney in the town. They are all built of stone. The houses are lofty, and the rooms spacious. Though no particular style of architecture has been adhered to in the construction of any one of the ranges, the general effect is imposing, and the whole exhibits considerable variety. The three principal blocks of building at the Quayside are the Merchants' Offices, the Queen's Buildings, and the Prince's Buildings. These are occupied as merchants' offices, and places of business. They form a singular contrast to the low, confined, and dark offices, formerly used by the merchants and brokers of Newcastle. In one of the principal buildings, the London and Northern Bank have a branch office. One of the most striking views which we get of the Quay, and the two bridges which span the river, is from the front of the Telegraph Office, at the corner of Queen's Buildings. This is a sight which ought not to be omitted by a visitor.

A notice and a view of the Old Nag's Head Inn (in this vicinity) was given at page 81. The woodcut on next page shows the change which it has recently undergone. It is now a lofty and handsome mansion of polished masonry, possessing considerable architectural merits, built after designs by Mr. Wardle. The building is devoted by Mr. Reid, the publisher of this Hand-Book, to the diffusion of information by the various agencies of printing, lithography, wood and copper-plate engraving, and bookbinding. Is it needful to add that this little work is the first-born of his establishment in its new locality? *Reid's Railway Guide*, that ubiquitous friend of the northern traveller, is, henceforth, to issue from it. In the drawing, a portion of Mr. Walters' new buildings are introduced.



Printing Court and Printer's Buildings.

CHURCHES AND CHAPELS OF RECENT DATE.

St. Ann's Church, on the New Road, was erected in 1768. It is a somewhat homely structure, built in the Italian style. The stones, obtained by the destruction of that part of the town wall which ran along the Quay, were used in its construction. It is a district church.

St. Thomas' Chapel.—The history of the chapel dedicated to Thomas à Becket, at the end of Tyne Bridge, and of the Hospital of St. Mary Magdalene, has been already given. When it became necessary to remove the old chapel, in order to improve the approaches to the bridge, it was resolved to reërect it on ground belonging to the Hospital of St. Mary Magdalene near the Barras Bridge. The present structure was opened in 1830. It is a handsome and commodious church, built, from Mr. Dobson's designs, in the Early-English style. The height of the tower, from the ground to the platform at the top, is 100 feet.

A change is about to come over the constitution of the Hospital of the Magdalene and the Chapel of St. Thomas'. The annual income of the hospital not unfrequently reaches the sum of £1800; and there is a prospect, in future years, of a very considerable increase. It is obviously unfitting that resources such as these, which, even after the abatement of the disease of leprosy, were used "for the comforte and helpe of the poore folks of the towne that chaunceth to fall sycke in time of pestilence," should be altogether diverted from medical uses, and chiefly expended upon a master and three brethren. A Bill has been brought before Parliament, which, though lost through an informality this session (1863), will probably become law next, containing the following provisions:—

The salary of the Master is to be restricted to £500, and he is to be charged with conducting the services in St. Thomas' Chapel.

Powers are taken for rendering the church a district church. £50 a year are to be given to St. Thomas' school.

£500 per annum are to be distributed in small weekly allowances amongst poor freemen.

And the whole remainder of the income is to be devoted to medical charities.

The present Master is the Rev. Clement Moody, M.A., Vicar of Newcastle.

St. Peter's.—This is a very handsome church, with a spire built in the Decorated style. It may be regarded as Mr. Dobson's most successful effort. In the chancel are several stained-glass windows by Wailes, and a painting of the Crucifixion by Reed.

The Chapel of the Virgin Mary.—This chapel, situated at Rye Hill, has been erected out of the funds belonging to the Virgin Mary Hospital. Near it are the alms-houses of the brethren. The late Benjamin Green was the architect. It is a remarkably fine specimen of the Decorated style, but the main buildings have a diminutive aspect in comparison with the lofty spire which surmounts them. The Rev. R. Anchor Thompson, M.A., is Master of the Hospital.

St. Paul's, High Elswick, is the church of a district separated from the parish of St. John's. The church is a plain but commodious one, in the Early-English style. The cost of it was defrayed by private contributions.

Christ Church.—This church is intended for the inhabitants of that part of the populous parish of All Saints that are resident in the Shieldfield. It is a district church, and was reared at the expense of the family of the late Mr. Robert Boyd. The church is a beautiful specimen of the Decorated style, with a well-proportioned and graceful spire; it is from the designs of the late Mr. Alfred B. Higham.

Jesmond Church is situated on the road leading to Jesmond. The Rev. Richard Clayton, M.A., was Master of the Hospital of St. Mary Magdalene, and Chaplain of St. Thomas', from 1826 until his decease in 1856. Mr. Clayton commanded the affections of the congregation of St. Thomas', and the respect of the whole town. He was foremost in every benevolent and religious enterprize; and those who differed from him in matters of church polity, were, from the catho-

licity of his spirit, always glad to hail him as their leader, in making an advance against the common enemy. His last illness was very brief. His departure was deeply mourned at the time, and is deeply mourned still. A number of circumstances rendering it desirable that a new church should be built, it was resolved to erect Jesmond Church by private subscription, and to regard it as a monument erected to his memory. The church was opened, by the lamented Bishop Villiers, in 1861. It is the church of a district which was severed from the parish of St. Andrew's. The tower is intended to receive a spire, when financial considerations admit of it. Mr. Dobson, who has adopted the Decorated style, was the architect.

The Church of St. Michael, for the district of Byker, was consecrated by the Bishop of Durham in 1862.

The churches and chapels of the Nonconformist bodies are numerous.

The Wesleyan Methodists have a large and exceedingly commodious chapel in Brunswick Place. It was erected in 1820. The building is of brick, with stone finishings. The same religious body have a chapel in Blenheim Street, of brick also, and smaller chapels in the suburbs of the town.

The New Connexion Methodists have a chapel in Hood Street. It was erected by Mr. Grainger in 1835. The building is in the Grecian style of architecture.

The Primitive Methodists have a large chapel in Nelson Street, built by Mr. Grainger.

The United Free Methodists have a handsome chapel in Prudhoe Street. It is built of coloured brick, with white stone facings. It was opened in 1862.

The Presbyterian Churches are numerous. The church in Blackett Street is a favourable specimen of the Decorated style of architecture. It was built in 1858, from designs by Mr. M. Thompson. Trinity Church, in New Bridge Street, is one of Mr. Dobson's buildings. It is a fine example of the Early-English style of architecture, but is placed in too low a situation. In Carliol Street and in Argyle Street are two other places of worship; they are

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commodious, but without peculiar architectural features. St. George's Church, in Gresham Place, was opened in June, 1863; without expensive ornament, it is exceedingly neat, and well suited to the purposes of public worship. John Knox Church is near the railway station. It is in the Early-English style, and is one of Mr. Dobson's happiest efforts. The tower has not yet received the spire that is designed for it. Two other churches complete the list. One is in Clavering Place; the other (Erskine Church) in Rye Hill. Both of them are of brick, and though built with every attention to neatness and propriety, have no striking architectural features.

The Independents have three places of worship in Newcastle. St. James's Chapel is a neat stone erection. The interior has been fit up with considerable taste; the pulpit is of stone. Mr. Thomas Oliver was the architect. West Clayton Street Chapel is a stone building, in the Italian style; it was erected by Mr. Grainger, and is made to harmonise with the street. The interior is chaste and commodious. St. Paul's is situated on the high ground at the head of the Westgate. Its architectural features are not striking. This church was built as a district church for a portion of St. John's parish, and was consecrated by the Lord Bishop of Durham in 1841. In 1854 it was sold by auction by the mortgagee, and was purchased by the Independent congregation at that time worshipping in Zion Chapel, who still hold it.

The Baptists have two important congregations in Newcastle. One of them occupies a commodious chapel in Bewick Street, near the railway station; the other, which formerly met in New Court Chapel, are at present without a place of worship of their own, but are preparing to build one in Ryehill; there are some smaller congregations of Baptists.

The Roman Catholics have three places of worship. St. Andrew's Chapel is approached by an entry from Pilgrim Street. It was opened in 1796. It is a brick building, without any feature of interest. Large galleries were added

to it in 1830. The congregation chiefly consists of Irish Roman Catholics. Between the chapel and the street is the residence of the priests. A small body of Dominican monks are at present accommodated here. A monastery and chapel are about to be erected for them at the Red Barns. St. Mary's "Cathedral" is at the west end of Clayton Street. It was erected in 1844, from designs by Mr. Pugin, and is in the Decorated style. However correct the details of this building may be, its general effect is not impressive. Many of the windows are filled with exceedingly good stained glass by Wailes. The east window, of seven lights, is the gift of the Dunn family. The spire, intended to crown the building, has not yet been erected. In 1858, a large mansion or "presbytery" was erected in the adjoining ground for the functionaries officiating in the "cathedral." St. Patrick's Chapel is a brick building, erected in the Wall Knoll, in 1765, by a Presbyterian congregation, who left it in 1841. It was for some time occupied by a private individual, who, in 1852, sold it to the Roman Catholics.

The Friends' Meeting House is in Pilgrim Street, near the Arcade. The present building was erected in 1805 in place of an older one. It is a plain but neat and comfortable place of worship.

The Unitarians occupy a very handsome building called "The Church of the Divine Unity" in New Bridge Street. This building was erected in 1854, on the removal of the congregation from their previous chapel in Hanover Square. It is in the Decorated style, and is from the designs of Mr. Dobson. The principal window over the entrance, and several of the side lights, are filled with stained glass, by Wailes, chiefly of a memorial character.

The Swedenborgians occupy the New Jerusalem Temple, in Percy Street, and the Jews have a Synagogue, in Temple Street, near the Cattle Market.

In Bath Lane is a large and convenient place of worship, in the Decorated style, built by the "Gospel Diffusion Church." Mr. Oliver was the architect.

It is not a little encouraging, to notice what a large number of churches and chapels, both in connection with the

national establishment, and independent of it, have been built by the present generation, and what a large proportion of them are the result of private benevolence.

CEMETERIES.

IN consequence of the crowded state of the church-yards in the town, a public cemetery was opened at Westgate Hill, in 1829. It is unconsecrated.

In 1834, a new cemetery was formed at Jesmond, one portion of which is consecrated, the other not.

In 1854, the church-yards were closed, and other places of interment provided by the various parishes. Each new burying ground has a consecrated and unconsecrated portion, and each is provided with two chapels. St. John's cemetery in Elswick Lane occupies a most beautiful site, and is very tastefully laid out. Both the chapels are placed together, and instead of each having a diminutive spire, one graceful and well-proportioned steeple rises from the point of junction to a considerable elevation; Mr. John Johnstone was the architect. The other cemeteries do not require remark.

PUBLIC INSTITUTIONS.

CORPORATION.

THE corporate officers consist of a Mayor, a Recorder, a Sheriff, a Town Clerk, an Under-Sheriff, a Borough Treasurer, 14 Aldermen, and 42 Councillors. There are at present about 20 Borough Magistrates. The present Mayor is Isaac Lowthian Bell, Esq.

The Police Force consists of 140 men, who are formed into four divisions, each being provided with an inspector and sub-inspector. The whole is presided over by a chief-constable.

FREEMEN.

There are about 1800 registered freemen in Newcastle. Their number remains nearly stationary. Those only who live within 7 miles of the town enjoy the elective franchise. Formerly freemen were exempt from some important tolls and duties to which others were subject. By legislative enactment, in 1835, this valuable privilege was restricted to freemen then living, their children then born, or apprentices then serving. The privileged class is quickly becoming extinct.

MARKETS.

The Corn Market.—This market is held on Tuesday and Saturday between 11 and 1 o'clock. The Saturday's market is the chief one. When we bear in mind how large the population of the town is, and that within a radius of ten or eleven miles it is surrounded by several other large towns, and centres of mining and manufacturing industry—each drawing its principal supplies of corn and flour from Newcastle—we can readily conceive that the business of the corn market must be immense. The market is well supplied from the immediate district, as well as from the northern division of the county. Considerable quantities are brought coastwise, chiefly from the southern counties, but of late years Scotland, in consequence of its improved agriculture, has contributed largely. Foreign imports are also large, chiefly from the Baltic ports and Danish islands. Much comes from the Black Sea and Mediterranean and some occasionally from France. No shipments have as yet come direct from America to the Tyne; this will probably take place ere long in consequence of the deepening of the water at the bar and in the channel of the river.

Hay Market.—This market was established in 1824, and has proved a great convenience to the community. In the olden time each considerable consumer was obliged to purchase his stock for the year at the time the hay was "won." Travellers along the north road used to be much struck with the large stock of hay near the Barras Bridge,

which belonged to Mr. Peter Forster of the Queen's Head Inn. Each year he added a year's consumption to one end of the stack and began cutting at the other. Persons without capital were dependent upon the farmers in the immediate neighbourhood, and upon a few dealers, who bought their supplies in summer. Since the establishment of the market the price of hay has been rendered more equable, and the area from which the supply is obtained has been greatly extended. By way of giving an idea of the importance of the market, the quantities exposed for sale during the month of February last is here given. A cart of hay is supposed to weigh a ton.

1863.			Carts of Hay.		Carts of Straw.
February 3	..	..	230	..	60
" 10	..	..	192	..	76
" 17	..	..	194	..	60
" 24	..	..	164	..	55

Cattle Market.—This also is a modern institution, the first market being held 27th July, 1830. Previous to the successful establishment of the Newcastle market, the butchers of Newcastle, Sunderland, and Shields were obliged to attend the Morpeth market to procure their supplies. For a long time the success of the Newcastle market was doubtful. The opening of the Newcastle and Carlisle Railway in 1838 gave it a great impetus, and in 1844 it became the principal market in the North of England.

The following statement, exhibiting the annual supplies at periods ten years apart, will give an idea of its growth and importance :—

Years.		Fat Cattle.		Sheep and Lambs.		Swine.
1842	..	5,974	..	117,010	..	12,360
1852	..	38,109	..	250,369	..	15,504
1862	..	54,936	..	286,110	..	34,544

The districts from which Newcastle cattle market derives its main supplies are the county of Northumberland and the shires of Berwick and Roxburgh. A considerable portion comes from Cumberland, and some from Durham. Most of the districts of Scotland that produce fat cattle send some. From the month of June until January a regular weekly supply is sent from the Dublin market. The foreign trade

commences about March, and continues until July; a weekly supply of cattle and sheep being derived from Hamburg, and a few cattle from Rotterdam.

In seasons of great scarcity some good cattle from Yorkshire, Lincolnshire, and Norfolk have been shown. A very large number of pigs come from the North of Ireland. This branch of the trade commences about October, and continues until March. No class of stock, coming to this market, has undergone so great an improvement during the last 20 years.

A large part of the stock sold in this market is consumed in the town and surrounding district. Considerable quantities of the best cattle are bought for the London, Lancashire, and Yorkshire markets. This branch of trade commences in January and finishes in June. In the autumn months large lots of half-bred sheep are bought for feeding purposes, and driven into Yorkshire. A considerable business is done in dead meat with the London markets.

POST OFFICE.

The state of the post office is a good index to the mental and commercial activity of a community. In the year 1831 there were, in the Newcastle Post Office, three clerks and four letter-carriers. If any record of the number of letters passing through the post office, at this time, exist, it is not accessible. At the close of 1839, before the introduction of the system of penny postage, there were five clerks and seven letter-carriers. How many letters, at this time, passed through the office, does not appear; but that they must have been an inconsiderable fraction of the numbers now dealt with, is plain from the fact that, at the present time, 16 clerks and 23 letter-carriers are required to transact the business.

In 1831 the post office was in St. Nicholas' Church Yard, and extended back into Dean Street, where it was on a level with the second story of the houses in that street. The south mail was due at 2 a.m. The guard of the coach blew his horn as he began the ascent of the street, and if that

failed to awake the clerk in attendance, he rang a bell communicating with the office. The bags for the north were then thrown out of the window into the street, and those which had just arrived, were drawn up by means of a block and tackle. Our progress of late has been so great, that it seems strange to think that so primitive a state of things should exist only 32 years ago. The following statements show the present state of the post office, and its progress during the last seven years. The number of letters, book-packets, and newspapers delivered in Newcastle and its neighbourhood, in April last, was 88,762, which is an increase of 21,489 as compared with April, 1856. The number of money orders issued in 1862 was 47,218, and their amount £96,314 16s. 8d. Last year the number issued was 51,918, and their amount £118,875 10s. 4d. The number of money orders paid at the Newcastle office in 1856 was 40,328, and their amount £83,194 16s. 9d.; in 1862 the number paid was 45,909, and their amount £102,944 1s. 8d. These figures contrast strangely with the state of things in 1831. Mr. Fenwick, who became a clerk in the post office that year, kindly supplies the following information:—When I joined, and for some time afterwards, the Money Order Department was in the hands of private individuals, though connected with the General Post Office. I do not remember the numbers issued and paid, but the amounts which were rendered quarterly were, for orders issued, under £100, and for orders paid, less than that sum, for the period. The charges were heavy—8d. in the pound when under £2; and, when above that sum, a shilling stamp was required in addition to the rate. The letter containing the order was charged double. Thus, if a poor Irishman was remitting a couple of pounds to his friend in Cork, it cost him—postage 3s., order 1s. 4d., stamp 1s.—in all 5s. 4d.

The whole money transactions of the Newcastle Post Office for the year 1862, amounted to the large sum of £268,422.

It is scarcely possible to appreciate the moral and social advantages resulting from the present state of things as

compared with the former. Our fathers looked with admiration upon the institution of mail coaches: we have seen the introduction of railway travelling, the penny postage, and electric telegraph; what is left for our children?

In other departments of the office there has also been a gratifying increase. Thus in 1856 the number of letters registered at the Head Office, Newcastle, was 9353; in 1862 it was 11,378, being an increase of 2025. The number of registered letters received at Newcastle for delivery in 1856 was 7085; in 1862 it was 10,515, being an increase of 3430.

One additional fact may be stated, as showing the amount of work performed in the Newcastle Post Office. The number of letters, book-packets, and newspapers that were posted at Newcastle, and places in its delivery, during one week, in August, 1857, was 68,449. Taking into account the magnitude of this number, the variety of the destinations of the documents, the indistinctness of the directions of many of them, and the extreme rapidity with which much of the work must be done, it may well be a matter of surprise that our communications are delivered with the amazing correctness and punctuality that they are.

The officials of the Post Office have a reading-room and library, which is supported by their own contributions and the donations (pecuniary, and in books) of some who are disposed to look kindly upon the services of this valuable class of men.

ASSAY OFFICE.

By an Act of Parliament, passed A.D. 1702, in the reign of Queen Anne, an Assay Office was established at Newcastle, which confers upon this town the privilege (enjoyed only by six or seven others) of assaying and marking silver plate. This office is under the immediate charge of the Newcastle Goldsmiths' Company, who appoint an assay master, responsible to Government for the collection of the duties. An attempt was made a few years ago to remove the establishment from our town; but, by a vigorous effort,

on the part of those interested, the project was abandoned. Newcastle is one of the few ancient provincial towns where any manufacture of the precious metal is carried on.

VOLUNTEERS.

In common with the rest of the nation, the men of Newcastle have put themselves in a posture of defence, in case, at any time, their country should become an object of attack. The officers of the regular army are chiefly taken from the upper class of society, whilst the rank and file consist, for the most part, of the lowest class. It is fitting that the middle class, who form so important a part of the framework of the commonweal, should be able to bear their part in the day of national trial, should such arrive.

When Napoleon I. threatened England with invasion, the men of that day banded themselves together, firmly resolved that a foreign foe should not march into Newcastle, except over their dead bodies. The Newcastle Volunteer Infantry, a force of between 300 and 400 strong, was chiefly recruited from the aristocratic class of the inhabitants. Their uniform being somewhat gay, they received the by-name of "The Tinsel Dons." They were under the command of Colonel Clennel. The Newcastle Associated Infantry, consisting, for the most part, of men of the middle and lower class, formed a regiment of from 800 to 1000 strong. It was commanded by Sir Matthew White Ridley, the grandfather of the present baronet.

Every preparation was made in case of invasion. The women and children were to be taken to Alston Moor, and carts were provided for their conveyance. To that eminent lawyer, Mr. Hopper Williamson, who was incapacitated by his deafness from taking his place amongst the volunteers, was given the command of this flying squadron. A code of signals was fixed upon, so as to arouse the country quickly, by night or by day, in case of need. On the evening of the 1st. of February, 1804, a false alarm was spread that the French had landed at Bamborough Sands. The beacon fires

blazed, and the alarm bell rang. The volunteers stood the test. In Newcastle, Gateshead, Durham, and elsewhere, a display of zeal and ardour, on behalf of their country, was manifested by all descriptions of men, which could not be surpassed. On Tuesday, the 7th of June, 1808, a grand review took place on Throckley Fell, which was then an open common. The occasion is still facetiously spoken of as "The Battle of Throckley Fell." All the volunteers and military, within a practicable distance, were present at it, the whole force consisting of nearly 10,000 men. The evolutions of the day were brilliantly performed.

Circumstances having again induced the friends of peace to use all prudent measures for its preservation, Newcastle has not been backward in the movement.

The Volunteer Force in Newcastle embraces three branches of the service, viz., Engineers, Artillery, and Rifles; and numbers altogether at the present time, about 1350 men of all ranks distributed as follows:—Engineers, 115; Artillery, 485; Rifles, 750. The first corps to spring into existence was that of the Rifle Volunteers, whose origin dates from the spring of 1859; and which held its first meeting for drill in the play-ground of Dr. Bruce's School in Percy Street, on Wednesday, June 15th, of the same year. For the first few months the spread of the volunteer movement in Newcastle was not rapid, but in the early part of the year 1860, when the intentions of the government towards the new force were more distinctly and favourably expressed, large accessions were made by the more prominent introduction of the artisan element into the ranks. The engine works of Messrs. Robert Stephenson & Co., furnished two companies of 60 men each, and those of Sir W. G. Armstrong and Partners, and of Mr. Morrison, sent one company each. In August 1860, the corps had so far developed in numbers and efficiency as to be able to proceed to Edinburgh 500 strong; and with other corps from this immediate neighbourhood to form a part of the volunteer army, which then passed in review before Her Majesty in the Queen's Park. The corps from the first has been under the command of

Lieut.-Col. Sir John Fife, and has reached a numerical strength of 800 men, at which, with occasional fluctuations, it has for the last two years remained.

In the early spring of 1860 a corps of Artillery was organized, under the command of Captain John Ismay, which has now arrived at a strength of 180 men. It consists of two companies, and being raised with a view to garrison duty, and for the coast defences, possesses an equipment of four 32-pounder guns of position, and is trained for the service of 68-pounders and the 100-pounder Armstrongs, with which the coast batteries at Tynemouth and elsewhere are supplied. These companies are attached to the 1st Northumberland Artillery Volunteers, which corps, under the command of Lieut.-Col. Addison Potter, was the first artillery volunteer corps raised in the United Kingdom.

In June, 1860, Lieut.-Col. Allhusen organized another Artillery corps, which, by an uniform and steady progress, has risen to an establishment of six batteries, and a strength of 306 men of all ranks. This force being designed for field-service, was, in the first instance, armed with four 18-pounder siege guns, on field carriages, supplied by government; but now, through the public spirit and enterprize of its members, it boasts, in addition to its original armament, of a battery of four 9-pounder muzzle-loading "Armstrongs" of the most approved pattern. The whole of these guns, with their necessary ammunition wagons, &c., being admirably horsed when occasion requires—affording, probably, a solitary instance of an artillery volunteer corps being armed at its own expense, and that, too, with the most efficient weapons of modern warfare.

The well-known Engine and Ordnance Works at Elswick, in addition to furnishing one company to the rifle volunteers, have produced a corps of Engineers, numbering 115 men, which, under the command of Captain Percy Westmacott, has attained a high proficiency in that particular branch of the service to which it has devoted its attention, and of which it has given signal proof on more than one occasion, when bearing an arduous part in those admirably organized field-

days, which the volunteers of this neighbourhood from time to time enjoy.

To these statements it must be added, that to both rifles and Captain Ismay's artillery, there is a small corps of cadets attached, the latter armed with small field guns. The propriety of forming a juvenile corps has been doubted by some.



BENEVOLENT INSTITUTIONS.

The Infirmary.—The Infirmary of Newcastle reflects honour on the benevolence of the town and surrounding district. Here the suffering poor receive the utmost attention that skill and kindness can supply. In case of accident, the patient is admitted by day or night without any recommendation; ordinary patients require a letter of admission from a governor. The institution dates from 1751. On the 23rd May of that year a house in Gallowgate was opened for the reception of patients. In the following September, Dr. Butler, Bishop of Durham, laid the foundation of the present building in the Forth Banks. It was ready for the reception of patients towards the close of the following year. Various additions have, from time to time, been made to it. The most important addition is the west wing, which was begun in 1852 and opened in 1855. The foundation stone of this building was laid by the Duke of Northumberland, who contributed £1000 to the expense of its erection, and who also presided at its inauguration. The cost of the wing was £6989; several alterations were made upon the old building at the same time, which brought the whole expenditure of the period to £10,554.

The number of patients received into the hospital during the year ending March 31st, 1863, was 1556; the number treated at their own homes was 1968, making in all 3534. Of these, the large number of 1668 were accidents.

The income of the house, from all sources, during the last

year was £5570. This is derived from annual subscriptions, donations, legacies, and the interest upon investments amounting to £23,000.

The spiritual wants of the patients are not neglected. At an early period a chapel (dedicated to St. Luke, "the beloved physician,") was set apart for sacred uses; and an endowment of £20 provided for the payment of a chaplain. Through the benevolence of Mrs. Blackwell, of Newcastle, the endowment has been increased by £100, and the services of an excellent chaplain have been secured, who, besides his more public duties, spends a considerable portion of each day in visiting the patients at their bedside.

The physicians and surgeons, on whom the chief medical duties devolve, give their services gratuitously.

A committee of gentlemen watch most assiduously over the general management of the institution, which is undoubtedly inferior in no respect to any in Britain.

It could be wished that its advantages were more extensively enjoyed by the community. More patients could easily be accommodated, if the means of meeting the enlarged expenditure were provided. The population of the district expands more rapidly than the subscription list to the Infirmary.

In the governor's hall are portraits of Sir Wm. Blackett by Sir Joshua Reynolds, and the Duke of Northumberland by F. Grant, and Matthew Ridley, Esq. by Webb, and Dr. Benson, Bishop of Gloucester, and Shute Barrington, "the princely Bishop of Durham" by Owen, and the celebrated surgeon Wm. Ingham, Esq. by Nicholson, and of Butler the author of the "Analogy," by an unknown artist. Some of these are works of great merit.

Dispensary.—If the Newcastle Dispensary occupies a humbler sphere than the Infirmary, it is not less useful. It deals with that numerous class of maladies which do not require or do not admit of hospital treatment. The poor are, by it, supplied with advice and medicine, either at the hall of the institution or their own homes. The Dispensary was founded in 1777. Last year, the whole amount of its income was £1,801, of which £962 consisted of legacies.

During the twelvemonth it had received no less than 11,913 patients, of whom 10,945 were cured.

The other medical charities of the town are a Fever House, a most useful and well-managed institution, founded in 1803; a Lying-in Hospital, founded in 1760; another charity of a kindred nature commenced about the same time, and now incorporated with it, for assisting poor married women lying-in at their own houses; and an Eye Infirmary, established in 1822.

The Royal Victoria Asylum for the Industrious Blind was established in 1838. It has been the means of doing much good. On the 1st of June last, it had forty inmates; there being an equal number of males and females. Its whole income during the last year was £2367; of which, £267 consisted of legacies.

The Northern Counties' Institution for the Deaf and Dumb is an admirable Institution, and has been the means of rendering useful and happy many persons, who would otherwise have been burdens upon their friends or the parish. It was established in the year 1839. It possesses premises on the Moor Edge, which are well adapted to its use, and which, in an architectural point of view, are highly creditable. Its capabilities are equal to the education of every indigent deaf and dumb child in the North of England. The number of pupils attending school at the last anniversary was 60. Its whole income, for 1862, was £1,687; of this £622 consisted of legacies.

The Penitentiary and Home.—The Infirmary attends (in a ward specially set apart for it), to the physical sufferings of fallen women. The Penitentiary has long laboured for their moral and spiritual renovation; in many instances, with remarkable success. The Home for Penitent Women is a kindred establishment, called for by the pressing exigencies of the present day. It is a remarkable instance of the large amount of good which may be effected by a very moderate outlay.

SAVINGS BANK.

THE Newcastle Savings Bank has been the means of producing habits of frugality in very many, and of enabling them to maintain their independence in old age and in declining health. At first the institution was viewed with mistrust by many of the working classes, but that feeling has now entirely vanished. The Newcastle Savings Bank was formed in accordance with a resolution, passed at a public meeting, held in the Guildhall, 21st November, 1817. Of the requisitionists, originating that meeting, Dr. Headlam alone survives. The bank was opened 10th January, 1818. Of its first directors, John Fenwick, Esq., alone survives. Of its first trustees, William Woods, Esq., (the head of the well-known banking establishment of Woods and Co.) is the only one living.

The following figures show the great success which has attended the undertaking :—

Year.	Number of			Balance.
	Accounts.			
1828	4,200	£219,002
1838	5,373	218,533
1848	9,534	347,365
1858	13,341	441,130
1862	16,232	521,480

The building in which the business of the bank is conducted was opened on the 29th of April last. It is well adapted for the purpose, and is an ornament to that part of the town. It cost about £10,000. The bank is open for the receipt and repayment of deposits on Saturdays, between the hours of 11 and 1, and 6 and 8; and on Mondays between 12 and 1. It is exceedingly desirable that the bank should be open every day.

LITERARY INSTITUTIONS.

The Literary and Philosophical Society.—This society does honour to the intelligence and liberality of a generation that

has almost entirely passed away. Taking into account the early period of its foundation, and the facility with which any one can become entitled to all its benefits, it may be said to stand almost alone in the kingdom. The society was formed January 24th, 1793. This was just three days after Louis XVI. had died ignominiously on the scaffold, and the very day on which the French Ambassador was summarily dismissed from London. A long and desperate war was imminent, and the hearts of all thoughtful men must have had their own misgivings. Besides, at this period public attention had not been turned to the subject of the diffusion of knowledge. This was left to the Universities, the Endowed Grammar Schools, and the Dame Schools of the land. The names of Brougham and Birkbeck were as yet unknown to fame. All honour to the men who, in that gloomy hour, met in the Assembly Rooms to form a literary society. The Rev. William Turner and the Rev. Edward Moises were foremost in the work. The principal object of the society, in the first instance, was the reading of papers, and the promotion of friendly discussions upon scientific and literary subjects. The formation of a library necessarily followed. At present the library, which consists of more than thirty thousand volumes, forms the foremost feature of the society's arrangements. Its meetings for literary discussions have been superseded by the lectures which are delivered during the winter months, and by the discussions which take place at the sectional societies to which it has given rise—the Antiquarian, the Natural History, the Architectural, and others. The present buildings of the society were erected at a cost of £16,000, and were entered upon in 1825. They are upon the site of the town house of the Earls of Westmoreland. The present lecture room was constructed by Sir Wm. Armstrong, at a cost of £1500. The late Robert Stephenson left the society the munificent sum of £10,000. Surrounding the grand staircase are a full-length statue of Mr. Losh, formerly Recorder of Newcastle; four slabs of sculptured alabasters from Nineveh, the gift of W. K. Loftus, Esq.; and some casts of the Elgin marbles,

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representing the battles of the Centaurs and the Lapithæ. The great library is a handsome room, and well adapted for the purposes of study. Arranged on pedestals around the room are marble busts of several distinguished individuals connected with the town. At its last anniversary meeting the society had on its books 1336 members, and its income amounted to above £1909. The annual subscription is one guinea. The youngest member, on paying his first subscription, has the same interest in all the property of the society as the oldest. Of few societies of a literary character, after seventy years of existence, can so satisfactory an account be given.

The Society of Antiquaries of Newcastle-upon-Tyne was founded in 1813. It is the oldest provincial archæological society in Britain. It has published 4 volumes of *Transactions* in 4to and 5 in 8vo, which are in considerable request. Its museum in the Castle is peculiarly rich in Roman inscribed and sculptured stones. The number of its members is about 90; the yearly subscription is £1 1s.

The Natural History Society.—Newcastle has long ranked amongst her sons, men known to fame as exponents of the wonders of nature. Bewick was a naturalist of a high order as well as an engraver. Mr. Winch was an able botanist. William Hutton, in his *Fossil Flora*, turned over a new page in the mysteries of creation. Messrs. Albany and John Hancock, Mr. Alder, and a host of others are still engaged in extending the boundaries of our knowledge. It was natural that these men should form a society for the promotion of their common studies. It has been in existence for 35 years. Its museum adjoins the building of the Literary and Philosophical Society. In order to promote a love for the study of natural history, amongst even the humblest ranks of society, it is thrown open to all at the nominal charge of 1d. for each person. It is much frequented by the pitmen and others of the same class, on Saturday afternoons. The whole aspect of the museum is light and agreeable. Its chief features are its collection of British birds, its collection of fossils from the coal measures, and of corals, a considerable

proportion of which were contributed by the late Earl of Tankerville.

The Tyneside Naturalists' Field Club is an affiliated and very thriving institution. It was formed on the 25th April, 1846, for the practical study of natural history and antiquities. It now consists of nearly 500 members, and has published five volumes of Transactions.

Mechanics' Institution.—An effort was early made to extend the advantages of intellectual culture amongst mechanics, shopmen, and others of similar rank. At a meeting, held in 1824, which was presided over by George Stephenson, it was resolved to form a society with this object. It is now in a comparatively flourishing condition. It has a library of 9000 volumes, a large reading-room, and well conducted evening classes. The premises which it now occupies in Blckett Street having been found too small, an effort is being made to erect a new building beside the Weaver's Tower in New Bridge Street.

The North of England Institute of Mining Engineers, and of others interested in the prevention of accidents in mines, and in the advancement of mining science generally, was founded in 1852. It consisted then of 80 members, and now numbers above 300. Nicholas Wood, Esq., has been president since the commencement, and the success which has attended the institution is greatly due to his unwearied exertions.

In the inaugural address by the president, in 1852, the objects of the institution were set forth as follows:—1st. By the union and concentration of professional experience to endeavour, if possible, to devise measures which may tend to avert or alleviate those dreadful calamities which have so frequently produced such destruction of life and property, and which have always been attended with such misery and distress to the mining population of the district; and 2nd, to establish a literary association more particularly applicable to those engaged in researches in the theory and practice of mining, than any of the institutions at present established in this locality.

Twelve volumes of Transactions have been published, containing nearly 100 papers, many of which are very valuable. Some of these are standard works on the subjects embraced, and are constantly referred to by those engaged in the mining profession. The Transactions have a considerable sale, not only in England, but America.

The Farmers' Club.—The same spirit of inquiry which pervades other classes has animated the agriculturists of the district. At the close of 1845 the Farmers' Club was formed, the chief object of which is the diffusion of knowledge upon subjects connected with the cultivation of land. Papers are read and published, and important discussions take place upon the subjects coming under review. The club numbers upwards of 300 members. It has a well-selected library. The premises of the club immediately adjoin the Corn Market. One room is reserved, into which members may retire for the transaction of business during market hours.

Schools.—In addition to the schools referred to in the previous sections of this work, numerous other establishments public and private are conducted in Newcastle for the instruction of the youth of the community. The only institution partaking of the nature of a college is one for the education of medical practitioners. In 1834, a medical school was established in the town, chiefly through the exertions of Sir John Fife. In 1851 a similar institution was formed in connection with the Durham University. Both institutions are now united, and regular courses of lectures are given at the Neville Hall, in Westgate Street.

NEWSPAPERS.

THE earliest instance of the printing of a newspaper in any provincial town in Great Britain occurred in Newcastle, during the sojourn of Charles I. in the north, in 1639. He was attended by Robert Barker, the royal printer, who

issued a news-sheet from time to time. During the second visit of the same King to Newcastle, under less auspicious circumstances, in 1646, Stephen Bulkley, the successor of Barker, came to Newcastle from York; but, although several books and tracts were published by him, he did not undertake a newspaper. Bulkley continued for many years at Newcastle and Gateshead, but ultimately returned to York. After his departure, Newcastle was without a printer till 1708, nor indeed was any such to be found in any town in the North of England, with the exception of York, where the King's printer for the Northern Counties resided. At this date John White, the son of this functionary, established himself at Newcastle, and three years later commenced the publication of the first local newspaper north of the Trent—the "Newcastle Courant." At this time the London post arrived in Newcastle thrice a week—on Mondays, Wednesdays, and Saturdays, and on each of these days the "Courant" was printed, its contents being derived from the London newspapers, without a particle of local intelligence, beyond what might be gathered from an occasional stray advertisement. The first number appeared on the 1st of August, 1711, in the form of a pamphlet of 12 small quarto pages, the price of a single paper being 1½d., and the subscription for a quarter 4s. 6d. In 1720, it became a weekly paper. Soon afterwards it underwent another change. This third series dates from Saturday, May 1st, 1725, and the papers are numbered consecutively from that period to the present day.

The "Newcastle Journal" first appeared on the 7th of April, 1739, on a handsome folio sheet, printed by Isaac Thompson and William Cuthbert, at the Head of the Side. It had a comparatively prolonged existence, but it ceased to be published before the close of the last century.

The "Newcastle Chronicle" was first published on Saturday, March 24th, 1764, and has been continued to the present day. It was established by Thomas Slack, who was for some years the manager of the printing office of the "Newcastle Journal."

On the 1st of June, 1802, the "Tyne Mercury" began to be published; it ceased in 1843.

The first number of the "Newcastle Journal" appeared May 12th, 1832. On December 29th, 1860, its last issue as a weekly paper occurred; it thenceforward became the "Newcastle Daily Journal."

On February 11th, 1846, the "Newcastle Guardian" made its first appearance, and is still continued.

The "Gateshead Observer" was established in 1837, and continues to appear weekly.

The "North of England Advertiser," a weekly paper of large circulation, was established in 1855.

In this brief sketch it has not been thought necessary to name several other newspapers, which arose and quickly disappeared.

During the greater part of the period embraced in this review, newspapers were heavily taxed. Each copy of the paper paid a duty of 4*d.*, and each advertisement, long or short, 1*s.* 6*d.* The uniform price of a Newcastle newspaper was 7*d.* This large charge restricted the circulation of periodicals, and rendered, in towns like Newcastle, a more frequent publication than once a week an impossibility. On the removal of the newspaper stamp and the advertisement duty, a remarkable change was effected. Daily newspapers at the price of a penny sprung into being.

The "Northern Daily Express" was the first in this movement. Anticipating, by a few weeks, the removal of the stamp duty, its first number appeared at Darlington, on the 21st April, 1855. Mr. John Watson was its spirited proprietor. On the 30th October that same year, the Express was removed to Newcastle, where it has continued to appear regularly ever since. An enterprise so novel as the establishment of a daily newspaper in a provincial town was necessarily a difficult one. The "Northern Daily Express" had its initiatory trials. It was thought that a *penny paper* could be worth nothing. Its weekly contemporaries had no reason to look upon it with favour. The extended machinery of a daily publication cannot be easily organised. Its

difficulties culminated in the month of March, 1856, when Mr. W. C. Marshall, its present proprietor, joined the enterprise, and succeeded in placing the newspaper on a solid and satisfactory basis. To him the community of the North of England are chiefly indebted for the establishment amongst them of a cheap daily press.

In this free country no one is left long to pursue a successful career unopposed. On the 1st of May, 1858, the proprietors of the "Newcastle Chronicle" began the issue of the "Daily Chronicle," in addition to their weekly publication. On the 2nd January, 1861, the "Newcastle Journal" became a daily paper. Newcastle has thus at the present time, the advantage of three daily newspapers, besides (including Gateshead) five weekly ones.

It is impossible to over-estimate the importance—for weal or woe to the community—of the impulse given to newspaper circulation, by the removal of the duty on newspapers, and more recently on paper. The wide dissemination of a good newspaper stimulates thought, increases knowledge, facilitates commercial enterprise, and concentrates for useful ends, the individual force of the community. Great fears, were at one time entertained, that the cheap press would pander to the depraved appetites of the lowest of the vulgar. To a great extent, they have not been realized. In Newcastle, the intellectual character of the press has been elevated, and a greater amount of independence exists than was formerly the case.



FAMOUS PERSONS CONNECTED WITH NEWCASTLE.

THERE are many names unknown to fame, which the inhabitants of Newcastle ought not to suffer to fall into obscurity. The list here attempted, is not, however, of a local character, and those celebrities only will be mentioned respecting whom the visitor will be as much interested as the townsman.

JOHN SCOTUS *alias* Duns, or Duns Scotus. Bourne gives us the following account of him :—When he had studied some years with great advantage at Oxford, he returned into Northumberland, his native county, and took upon him the habit of St. Francis, at Newcastle. In 1304 being appointed professor at Paris, he there taught a course of divinity. He did the same at Cologne with wonderful applause ; at which time there arose at Cologne the controversy about the Conception of the Blessed Virgin Mary—whether she was conceived in original sin or not ? All the followers of Albertus Magnus affirmed that she was ; Scotus and his adherents positively asserted the contrary. Here it was that he gained the title of the “Subtile Doctor.” He died miserably in 1309, being taken with an apoplectic fit, and too hastily buried ; for nature, having too late wrought through the distemper, he vainly mourned for assistance, till at last, beating his head against the tombstone, he dashed out his brains, and so expired.

NICHOLAS RIDLEY, Bishop of London, was born at Willimontswick Castle, near Haltwhistle, near the beginning of the sixteenth century. He was educated in Newcastle, and afterwards at Pembroke College, Cambridge. He was led to the stake, along with Latimer, on the 16th of October, 1555. Burnet says that for his piety, learning, and solid judgment he was the ablest of all the Reformers.

JOHN HORSLEY, the celebrated author of the *Britannia Romana*, was born in Newcastle about the year 1685. He received his early education at the Royal Free Grammar School of his native town, and pursued his academical studies at Edinburgh. He was minister of the Presbyterian Congregation, Morpeth. He died in 1732, just after setting the last hand to his great work.

WILLIAM ELSTOB and ELIZABETH ELSTOB, the great Saxon scholars, were born in Newcastle, the former in 1673, the latter in 1756. Their efforts to advance the study of Saxon literature were greatly restricted by a want of sympathy in those who had it in their power to assist them. Miss Elstob was obliged for some time to keep a dame school, in order to procure the necessaries of life.

CHARLES AVISON, the author of an *Essay on Musical Expression*, was born early in the eighteenth century. The place of his birth is not known, but his early years were spent in Newcastle. He became organist of St. John's in 1736, and afterwards of St. Nicholas'. He died in 1770.

MARK AKENSIDE was born 1721; he died 1770.

CHARLES HUTTON, the mathematician, was born in Newcastle, in 1737; he died in London in 1823. He began life as a pitman, but receiving an injury in his arm, which unfitted him for manual labour, he became a school-master. The last school-room which he occupied in Newcastle was one which he built in the court in Westgate Street, immediately below Denton Chare. He afterwards became Mathematical Professor in the Royal Military Academy at Woolwich. Owing to the extreme fear which his son, Lieutenant-General Hutton, entertained that the humble origin of his father should be publicly known, no sufficient biography of Hutton was published at the time when it would gladly have been received. A memoir of him was read, by the father of the present writer, before the Literary and Philosophical Society of this town, which was published by the society. The accuracy of Dr. Hutton's *Plan of Newcastle* is not exceeded by any that have yet appeared.

JOHN BRAND, the antiquary and historian of Newcastle, was born in Newcastle about 1743. He served his time to the trade of a shoemaker, and afterwards became secretary to the Cordwainers' Company. Through the kindness of his former preceptor, the Rev. Hugh Moises, he was enabled to proceed to Oxford. He then entered the church; becoming, in the first instance, curate of St. Andrew's, in his native town. In 1784, he became secretary to the Society of Antiquaries. He died in 1806. His *History of Newcastle* is a work of great merit and accuracy. His *Popular Antiquities* is more generally known.

WILLIAM SCOTT, Lord Stowell, was born at Heworth in 1745. He was Judge of the High Court of Admiralty. He died in 1836.

JOHN SCOTT, Earl of Eldon, was born in Newcastle, 1751. He died in 1838.

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CUTHBERT COLLINGWOOD, afterwards Lord Collingwood, was born in Newcastle in 1750. He died at sea in 1810.

THOMAS BEWICK was born at Cherryburn House, near Ovingham, in 1753. The house in which he carried on the business of an engraver is situated in St. Nicholas' Churchyard, Newcastle. He died in 1828. The cut at the close of this section is a reproduction of one of his tail-pieces.

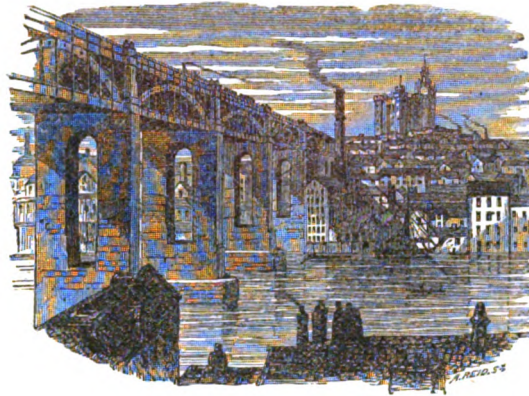
ROBERT MORRISON, the celebrated Chinese scholar, was born at Buller's Green, near Morpeth, in 1782. When he was three years of age his parents removed to Newcastle. He wrought as a last-maker in a shop in Morrison's Court, Groat Market. He died at Canton in 1834.

THOMAS MILES RICHARDSON, SEN., an artist of great merit, was born in Newcastle in 1784. He began life as a cabinet-maker. With the view of indulging his love for art, he became, on the death of his father, in 1806, master of St. Andrew's Free School. It is said that Richard Grainger was his first pupil. A few years afterwards he resigned the school, and devoted the whole of his time to his profession. His excellence as an artist is the more surprising as he never received any instructions, nor ever saw an exhibition until the 28th year of his age, when on a visit to London from ill-health.

GEORGE STEPHENSON, civil engineer, was born at Wylam in 1781. He died at Tapton House, 1848.

ROBERT STEPHENSON, civil engineer, was born at Wilington in 1803, and died in London, 1859.





THE RIVER TYNE.

Few streams in this fair land are so beautiful in themselves, or run through scenery so varied, as the Tyne and its tributaries. Springing, on the one hand, from the northern extremity of the Penine Alps, and, on the other, from the southern links of the Cheviot range, its earlier course is through a district wild and free—a district where the clouds sweep with their shadows hills of varied form and graceful outline. Attaining the low grounds, it presses on through fields of rare fertility; woods, castles, towns, and, here and there, a sacred fane crowning its banks. Approaching the great centre of the commerce of the North of England, it assumes features that are peculiar to itself—features which if they are forbidding to some, are full of interest to those who through the cloud of a preliminary process can discern the value and beauty of the products which result.

The South Tyne springs from the flanks of Cross Fell. The Cumbrian mountains, attracting the clouds brought from the Atlantic by the south-west wind, are bountiful nurses to the streams which spring from them. The town of Alston is the great centre of the lead mining trade in

England. It is said to stand higher than any other market town in the island. Here the Tyne receives the river Nent, an abundant stream. The brilliancy of the waters of both the Tyne and Nent is not unfrequently interfered with by the "washings" from the lead mines. At Lambley the river is crossed by the graceful viaduct of the Alston railway. The scenery is bold and beautiful. Featherstone Castle, which is to a large extent a modern building, is situated in an umbrageous nook. Bellister Castle, now in ruins, is passed, and the town of Haltwhistle is reached. At Haltwhistle, the church, the castle hill, and one or two peel houses, are the chief objects of interest. The river which has hitherto run in a northerly direction, now bends to the east. Near to this point it receives two important feeders, both of which have crossed the line of the Roman Wall, the Tipalt, and Haltwhistle Burn. Following it in its course, we pass on our right hand Unthank Hall, on our left Hardriding, and on our right again Willimonstwick Castle, the birth-place of Ridley the Martyr. At Bardon Mill is a station, on the Newcastle and Carlisle Railway, at which persons wishing to visit the famous Roman station of Borcovicus, the modern Housesteads, usually alight. We next pass the hamlet of Beltingham, on the right hand, its simple church standing prettily upon a knoll, and we are presently at Ridley Hall, the seat of Mrs. Davidson. Here the River Allen flows from the south into the Tyne. This romantic river is formed of two streams. One of them, the East Allen, rises near Allenheads, the centre of the extensive mining operations of W. B. Beaumont, Esq., M.P., so ably superintended by Thomas Sopwith, Esq., F.R.S. The West Allen flows past Whitfield the seat of the Rev. J. A. Blackett Ord. Staword Peel is a ruined fortress, occupying a rocky peninsula, in the basin of the united stream, not far from its junction with the Tyne. Haydon Bridge, a somewhat populous village, is reached. Not far from it, to the south, is Langley Castle, a noble but ruined pile, once belonging to the Percy family, now to the Greenwich Hospital. Between this point and

Hexham the scenery is peculiarly rich and varied. After passing Warden Hill, the South Tyne coalesces with its sister stream from the north, and both flow on in loving harmony to Hexham. Few towns have so interesting an aspect, and few retain so many traces of their early history—Roman, Saxon, and Monastic—as Hexham. Its priory church is a beautiful specimen of the Early-English style, and its crypt, the work of the Saxon Bishop Wilfred, is formed of Roman stones. The vicinity of Hexham is cultivated as garden ground, and Newcastle derives a large part of its supplies of fruit and vegetables from it.

Before pursuing the river further, we will trace, from the beginning, its northern branch. The North Tyne presents scenery still more bold than that of the south; it is for the most part more rapid in its course, and its waters of a darker hue. No mining operations have as yet interfered with the purity of the stream. It drains a larger surface than the South Tyne, and consequently may be supposed to carry down a larger quantity of water. The visitor cannot wander over the heath-clad hills in which it has its source, without thinking of those centuries of disorder and violence which reigned here before the union of England and Scotland. The peace which now rules is all the more pleasant from the contrast. The North Tyne rises upon the boundary line between the two kingdoms, a little beyond Keilder Castle—a mountain retreat of the Duke of Northumberland. It soon receives the Deadwater and the Keilder, both of them streams superior in size to itself. Near to Keilder is the place where the red deer last roamed wild in England. The river pressing past Mounces, a shooting-box belonging to the Earl of Durham, and Otterstonlee, a pretty farm-steading, reaches Falstone, a village of small appearance, yet of great importance in the district. Before reaching Hesleyside, the ancient seat of the Charltons, it receives a considerable feeder, the Tarset. After passing Bellingham, the most important “town” in the district, it receives, at Reedsmouth, the waters of the river Reed. The Reed rises from the flanks of Carter Fell, passes two important Roman stations, as well

as the battle-field of Otterburn, and is twice crossed by the Roman road, the Watling Street. Wark is the centre of one of the greatest baronies in the kingdom; on its Moat Hill the chiefs of Northumbria have, doubtless, sat in the days of yore, in the open air, and dispensed a stern but ready justice. Chipchase Castle, on the north of the river, the seat of Hugh Taylor, Esq., is an ancient stronghold, to which modern additions have been made; not far off, on the other bank, are the well-wooded house and grounds of Nunwick, the seat of the Allgoods. Further on, on the right bank of the river, we come to the village of Barrasford, with Swinburne Castle behind it; on the left bank is Haughton Castle, a building of great antiquity and great beauty, belonging to George Crawshay, Esq. Then, passing the church and village of Chollerton on our left, Humshaugh on our right, and Cocklaw Tower again on the opposite side, we reach the hostel at Chollerford. The next three miles present scenes of peculiar beauty. The river leaps from shelf to shelf of its stony bed; bold projecting rocks of varied hue restrain it in its course; and trees bending over it, as if in blessing, lend the grace of their form and the charms of their colouring to its own native lustre. Shortly after leaving Chollerford, the river crosses the line of the Roman Wall; here are the massive remains of a bridge, which the floods of seventeen centuries have been unable to shake. On the right bank is the Roman station of Cilurnum and the mansion of Chesters, the seat of the Claytons. Walwick Grange is next passed on the right hand, and Wall on the left. Warden Hill, crowned with an ancient British fortification, is now in sight; this being passed, no barrier impedes the union of the twin rivers, and they blend their fortunes for ever. Few sights are so interesting as the union of two considerable rivers; this can here be easily enjoyed, as the Border Counties Railway brings the traveller into close contiguity with the scene. St. John Lee Church crowns the high ground on our left.

After passing Hexham, the river has, on its left bank, the castellated mansion of Beaufront and the Elizabethan pile of Sandhoe—both modern erections; next it leaves, on the

right, the ruins of Dilston Hall, with its sombre memories, on the banks of the romantic and rapid river, the Devil's Water, and presently passes under the bridge of Corbridge, the only bridge on the Tyne which was not overthrown by the flood of 1771. Farther on, it has the Riding on its right bank and Styford on its left; next, it comes to Bywell, interesting on account of its old church, its hall, and its sylvan scenery. The smoke and (at night) the glare from the Mickley coke ovens, on the right bank of the river, remind us that we have come within the limits of the



The House in which George Stephenson was born.

Newcastle coal-field. Prudhoe Castle, once belonging to the Umfreville family, now to the Duke of Northumberland, is soon reached. Ovingham, on the left bank, is a place of rare beauty. The view from it of the Vale of the Tyne, in both directions, and of the Castle opposite, is peculiarly lovely. In this vicinity Bewick was born, and many of its sylvan nooks he has depicted in his "tail pieces." A little beyond this, Wylam stands upon the left bank. It used to be a pretty village, but the smoke and refuse of its iron furnaces have begrimed both earth and sky. The cottage in which George Stephenson was born is a little to the east of Wylam. The woodcut represents it. At this point,

Stanleyburn, the boundary line between Durham and Northumberland, joins the river from the south. Close House, the charming seat of the Bewick family, stands on the left bank, embowered in trees. Ryton, with its beautiful church and noble trees, stands prominently on its left bank. Newburn, a place of great antiquity, and where the river, for the last time, is fordable, is on the other side. A little further down, on the right bank, is Stella, where there is a staith for shipping the coals of the Towneley Colliery. Adjoining Stella is Blaydon, where the Newcastle and Carlisle Railway Company have a station. As the river at this point is easily navigable for barges, it is the place where goods brought by water for transmission into the interior are put upon the rail, and where, on the other hand, the lead and other heavy goods brought down from the interior, and intended for shipment, are transferred to the river craft.

Here we have the wharfs of Jos. Cowen and Co., of the Railway Company, and of the W.B. Lead Company. Here too, the London Lead Company ship their lead. The natural advantages of the place have rendered Blaydon the seat of some important manufactures. Here are the extensive fire-brick works of Jos. Cowen and Co., and of Messrs. Harriman and Co.; the iron foundry of Messrs. Nicholson and Wilson; the saw mills of Messrs. John Nicholson and Sons; the works of the Blaydon Chemical Company, where artificial manures and other chemical products are prepared; the extensive bottle works of Messrs. Alex. Austen and Poole; besides lamp-black works and coke ovens.

After passing Blaydon, the river bends back, but after reaching Lemington, it once more pursues an easterly course. Lemington, which is on the left bank, is a place of manufacturing industry. Here are the blast furnaces and rolling mills of the Tyne Iron Works, and the glass works of Messrs. Harrison & Co. Here the Walbottle and the Wylam Collieries ship their coals, and Messrs. W. Stephenson & Co. their fire-bricks. Between Lemington and the railway bridge (still on the left bank), are the villages of Bell's Close and Scotswood. Here we successively pass the fire-brick works

of Messrs. Wm. Harriman & Co., the works of Mr. Wm. Robson for making red bricks and draining pipes, the fire-brick works of Mr. Thos. Carr, the pit and staith of the Montague Colliery, the manure works of Mr. Thomas Colbeck, the mills of Messrs. Fletcher & Co., where brown paper is made, and the fire-brick works of Mr. William Robson.

The present Railway Bridge was built in room of one which was destroyed by fire. Between the two bridges is the paper mill of Messrs. Nathaniel Grace & Co.; brown paper only is made. The Suspension Bridge for ordinary traffic, was opened in 1831. The length of it is 630 feet, the distance between the two points of suspension being 370 feet, with two half arcs of 230 feet each.

The right bank of the river, which for some time past has only presented a vacant shore, now again attracts attention. The river Derwent, after driving the extensive paper mills of Shotley Grove and Lintz Ford, skirting the Roman Station of Ebchester, and lending grace to the woods of Gibside and Axwell Park, passes Swalwell and joins the Tyne at Derwenthaugh. Swalwell has long been famous as the seat of the iron manufactory of Messrs. Crowley, Millington and Co. The works have for some time been in a declining condition, but having recently changed hands, a renewal of their prosperity may be reasonably hoped for. Here are also the forges of the Messrs. Spencer. On the Derwent, or at Derwenthaugh we have the coke ovens of the Marquis of Bute, Mr. Ramsay, and the Railway Company; the staiths of the Garesfield Colliery, belonging to the Marquis of Bute and of Ramsay's Garesfield; and the fire-brick works of Mr. Ramsay and Messrs. Hannington. Between the mouth of the Derwent and the mouth of the Team there is nothing on the right bank of the river to call for remark, excepting that here is the proof battery of the Elswick Ordnance Company. On the left we have the Delaval Pit and the fire-brick works of Messrs. J. O. Scott & Co.; Paradise, where Messrs. Hoyle, Robson & Co. carry on the manufacture of Venetian red; and the fire-brick works of Mr. William Cochrane Carr.

This brings us to Elswick, where are the extensive engine and ordnance works of Sir Wm. G. Armstrong & Co.; they cover an immense space of ground. In front of the Elswick works are the staith of the Elswick Colliery, and Mr. Cargey's fire-brick works. To the east of them are the boiler building yard of Messrs. Waterson Brothers, the foundry of Mr. Clarke, and the new and extensive tan works of Messrs. J. & E. Richardson. The huge gas holders of the Gas Company are now encountered; they are capable of storing a whole day's supply to the town. The Shot Tower lifts up its head beyond them. It is impossible to enumerate the various works which cluster together in the town; before arriving at the Tyne Bridge, we may, however, distinguish the engine factories of Messrs. Robert Stephenson and Co., and of Messrs. R. & W. Hawthorn. Reverting to the Elswick Engine Works, we find lying in the river, opposite to them an elongated island called the King's Meadows. Bourne speaking of it says, "it is a delicious place, and a great ornament to the river." On the south side of the river, in this vicinity we have the village of Dunstan, and the embouchure of the little river Team with the now lordly Tyne. At Dunstan, we have the saw mills of Messrs. Palmer Brothers, the iron works of Messrs. Fulthorpe, and the soda works of Messrs. Burnett. The Team traverses the beautiful vale of Ravensworth, and indicates the course which modern roads and railroads ought to have taken on their way to the Metropolis of the north. It is navigable for upwards of a mile inland. On its banks we have the wire works of Messrs. Newall and Co., Mr. Lucas' fire-brick works and a ropery.

Lower down, on the same side of the river, we come to Redheugh, where there is a station of the Newcastle and Carlisle Railway. It is principally used for goods traffic. Redheugh formerly belonged to the Earl of Derwentwater; his widow sold it to Dr. Askew, the ancestor of the present proprietor; the mansion is at present occupied by Mr. Geo. Hawks, of the firm of Hawks, Crawshaw and Co. We now get into the entanglements of Gateshead.

Before commencing the last stage of our journey, it may be well here to pause and gather up one or two facts respecting the extent of the commerce of the Tyne and the relationship subsisting between the seafaring towns on its banks. The writer is assured, upon good authority, that a greater amount of tonnage passes under Tyne Bridge than the whole of the exports of the city of Glasgow amount to. The shipping registered in the ports of the Tyne, exceeds, in tonnage, the shipping of the whole of Ireland, and it exceeds that of any other port in Great Britain, except London and Liverpool. In consequence, however, of its shipping being registered under the heads of Newcastle, Shields, and South Shields, and its custom-house returns being also divided, the Port of Tyne does not take the place which it ought among the harbours of Great Britain.

The Port of Newcastle-upon-Tyne is one of the ancient ports of the kingdom, and was held by the Corporation, together with the town in fee-farm, under the Crown, at the ancient annual rent of £100. The earliest charter extant is one of King John, which, however, refers to an earlier charter of Henry II. The port extends from Sparhawke (a rock in the sea) upwards to Hedwyn, now called Heddon, Stream, a distance of 17 miles, over which the tide flows. For custom house purposes, the lower part of the river has been recently made a separate port, and styled the Port of Shields. In the year 1850, the Corporation of Newcastle introduced into Parliament a Bill for transferring to Commissioners the conservatorship and management of the river and port. This Bill received the sanction of Parliament. The Commissioners have since been incorporated under the title of "The Tyne Improvement Commissioners," consisting of eighteen individuals, four of whom are Commissioners for life, named in the Act, and the remaining fourteen are elected annually, 6 by the Town Council of Newcastle, 2 by the Town Council of Gateshead, 3 by the Town Council of North Shields, and 3 by the Town Council of South Shields. The 4 Life Commissioners are ultimately to be reduced to 2, to be nominated by the Admiralty.

The income of the Tyne Commissioners for the year 1862 was £43,163. Their outlay in dredging, and works connected with the improvement of the river during the same period was £85,340. The excess of outlay was met by loans sanctioned by Parliament. All this is exclusive of the construction of the piers at the mouth of the river, which is provided for by a special fund. Since the commencement of operations £267,496 have been expended upon the piers.

A visitor to Newcastle, who, after seeing the town, has two or three hours at his command, should not omit sailing down the river to Shields or to Tynemouth. He will see a kind of trade carried on which is not elsewhere conducted to the same extent. The river from its mouth to the Tyne bridge forms an immense dock. The voyage to Shields is easily accomplished as steamboats leave the station opposite the Custom House every quarter of an hour. The visitor will find the Map of the Tyne, which accompanies this description, a sufficient guide. See Map at page 279.

CONTIGUOUS PLACES OF INTEREST.

ALNWICK.

THERE are many objects of interest to allure the visitor to Alnwick—the chief point of attraction being the Castle. This noble pile is of various dates. Large portions of its curtain walls, and the beautiful archways leading unto the keep, are of the Norman style, being reared by the Norman baron De Vesci, in the reign of Henry II. About the commencement of the 14th century (1312), the castle and barony of Alnwick passed into the hands of Henry, Lord Percy. He rebuilt nearly the whole of the castle in the improved style of architecture and military defence then in vogue. The Barbican is a work of peculiar interest and beauty. Henry de Percy, the second Lord of Alnwick, completed what his father left unfinished. To him are ascribed (1350) the graceful octagonal towers flanking the entrance into the innermost ward of the castle. In the middle of the 18th century, the castle again underwent great changes. “From length of time,” says Grose, “and the shocks it had sustained in ancient wars, this castle was become quite a ruin, when, by the death of Algernon, Duke of Somerset, it devolved, with all the estates of this great barony to the present Duke and Duchess of Northumberland, who immediately set to repair the same.” Unfortunately the spirit and genius of Gothic architecture were not understood in the days of the first Duke of Northumberland. To repair, as far as possible, the errors that were then committed; and to adapt the castle to the requirements of the present state of society has been the work of its present owner, the fourth Duke of Northumberland. The result is that the visitor now looks upon the noblest baronial pile of which (with perhaps one exception) England can boast. Mr. Salvin is the architect. The present Astronomer Royal, Professor Airey, is a native of Alnwick.

WARKWORTH.

A more pleasant excursion than a day at Warkworth cannot be conceived. The scenery is beautiful ; the remains of the Castle possess the highest interest, both in an architectural and artistic point of view ; and the cell of the hermit has charms sufficient to allure most men from the world. In addition to all this, some of Shakespere's most exquisite scenes (King Henry IV., parts 1st and 2nd) are laid at Warkworth, and Bishop Percy's well known ballad gives it increased interest. Considerable portions of the curtain wall of the castle are Transitional Norman. These are the remains of the castle built by Roger Fitz-Richard, somewhere between 1158 and 1173, and which was in a great measure destroyed by William the Lion in the latter year. The Lion Tower is next in chronological order, having, according to Mr. Hartshorne, been built by Henry fourth Lord Percy, of Alnwick, between 1398 and his death at Bramham Moor in 1407. The keep was erected by the son of Hotspur about the year 1434. It is "a marvellous proper dungeon of eight towres all jonyd in on howsse togethers." (For an account of Alnwick and Warkworth, see the Newcastle volume of the Archæological Institute, by the Rev. Charles Henry Hartshorne, M. A.)

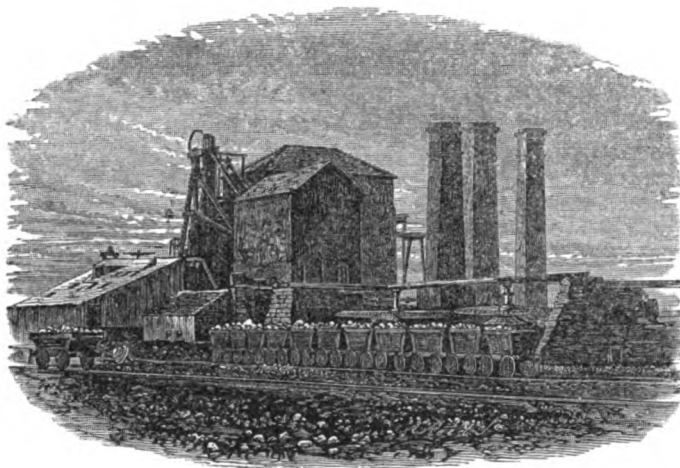
HARTLEY COLLIERY.

To few places in the vicinity of Newcastle has so much attention been drawn within recent years as to Hartley Colliery. It has been hallowed by sorrows of the most overwhelming character, and it has been the means of awakening practical sympathy to an extent previously unheard of. The colliery is dismantled, and there is no immediate prospect of work being resumed. Many of the widows and their families have left the place, but many remain, on

whom a word of consolation, spoken by a kind-hearted stranger, will not be lost, and to whom it is a relief to tell—

“So came I a widow,
And never shall have length of life enough,
To rain upon remembrance with mine eyes.”

Hartley Colliery is easily reached by the Blyth and Tyne Railway.



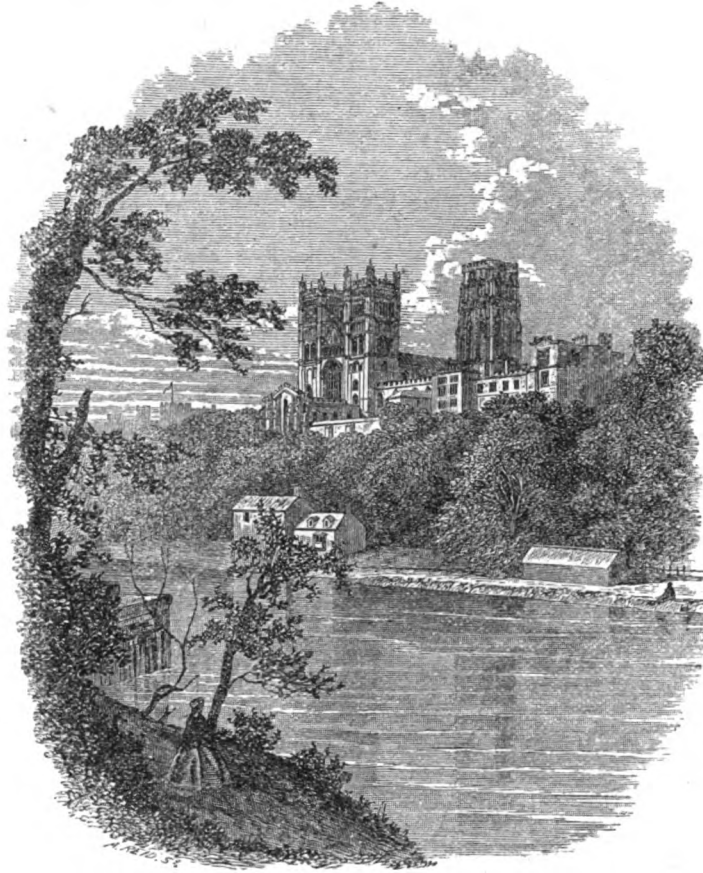
Hartley Colliery.

DURHAM.

The monks who bore the body of St. Cuthbert were particularly fortunate in being arrested, in their devious wanderings, on a hill so capable of military defence, and so replete with natural beauty, as that which is now crowned by the Castle and Cathedral of Durham.

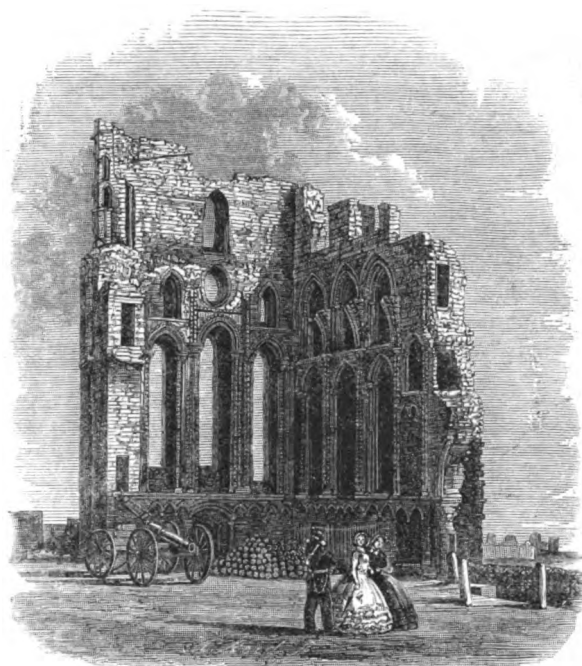
No portion of the Saxon cathedral remains. The present structure is almost wholly Norman. It is probably without exception the finest specimen of Norman architecture in existence. William de Carileph laid the foundation of it

in 1093; but Ralph Flambard, his successor in the see, raised the greater part of the building. The Galilee, a beautiful specimen of the Transitional style, was built by



Hugh Pudsey, who was appointed to the see in 1154; and the Chapel of the Nine Altars, which is an exquisite example of the Early English style, was commenced in the year 1235, under the auspices of Bishop Poor and Prior Melsonby.

The Castle of Durham was the fortified residence of the bishops of Durham, who, until a recent period, were princes palatine. The Norman part of this structure is the work of Bishop Pudsey, about the year 1174. Bishop Hatfield, about the year 1345, was the next to add materially to its strength. After many changes it is now devoted to the purposes of the University. Few places in Europe will so well reward the researches of the antiquary and the man of taste as Durham.



Ruins of Tynemouth Priory from the West.

TYNEMOUTH.

Tynemouth is but a short distance from Newcastle, and

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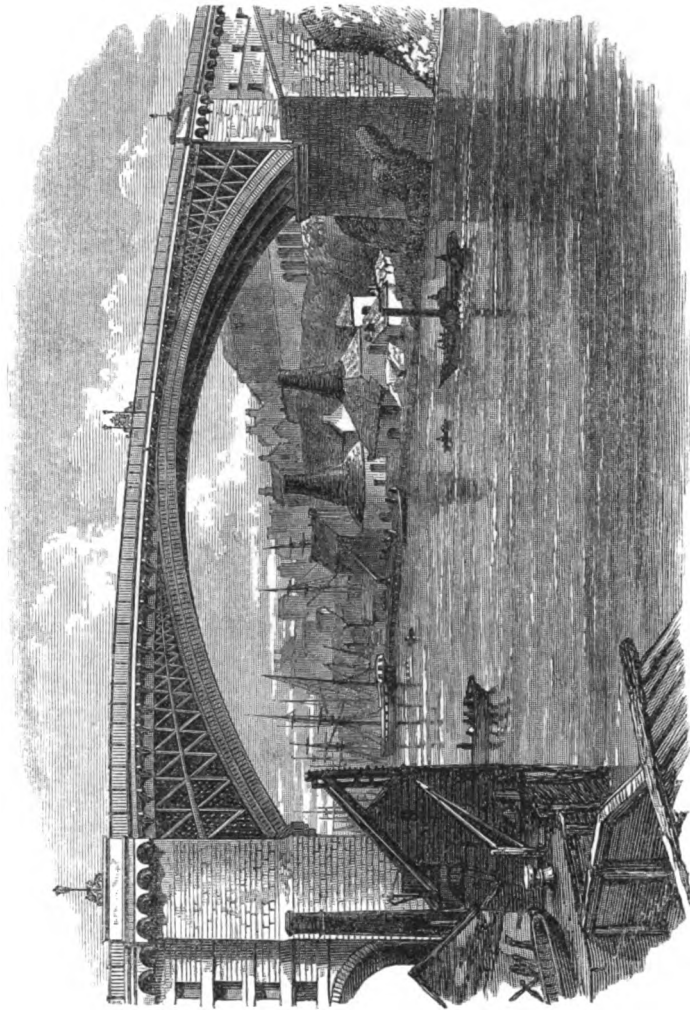
ought to be visited. It may be reached either by railway or by steamboat. The ruins of its Priory Church are exceedingly graceful, and the view, from the churchyard, of the mouth of the river and the sea, is ever-varying and always interesting.



Ruins of Tynemouth Priory from the East.

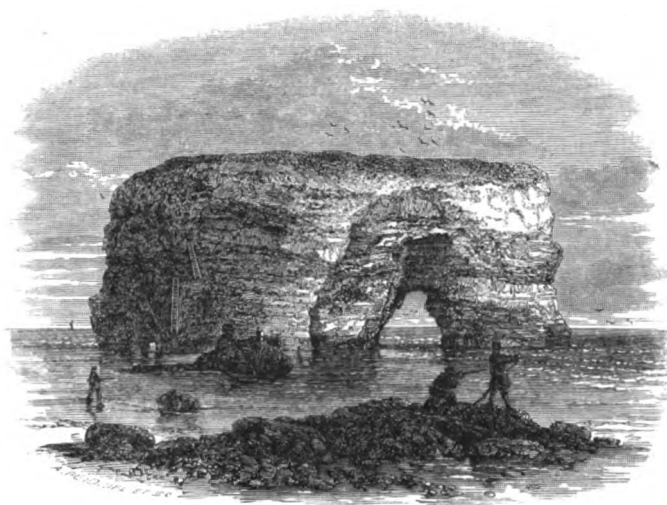
SUNDERLAND

This young and thriving town is easily reached by railway. It is a place of great commercial enterprise and activity. Its piers, docks, and bridge are the chief objects of interest to visitors. The bridge, which is of iron, consists of a single arch 236 feet in span, having a height



Sunderland Bridge.

of 100 feet from the surface of the river at low water. This remarkable structure was finished in 1796, having cost £33,400. In 1856 it was found necessary to strengthen and widen the bridge, as well as to improve its approaches. This was done according to plans furnished by Mr. Robert Stephenson. The leading feature of his design was the throwing across of three great tubular girders. The cast-iron rings of the original bridge were replaced, in the new one, with malleable iron lattice-work. The total cost of the alterations was £40,000. The tower of the Church of Monkwearmouth (the northern suburb of Sunderland) exhibits Saxon work, and is contemporary with Jarrow.



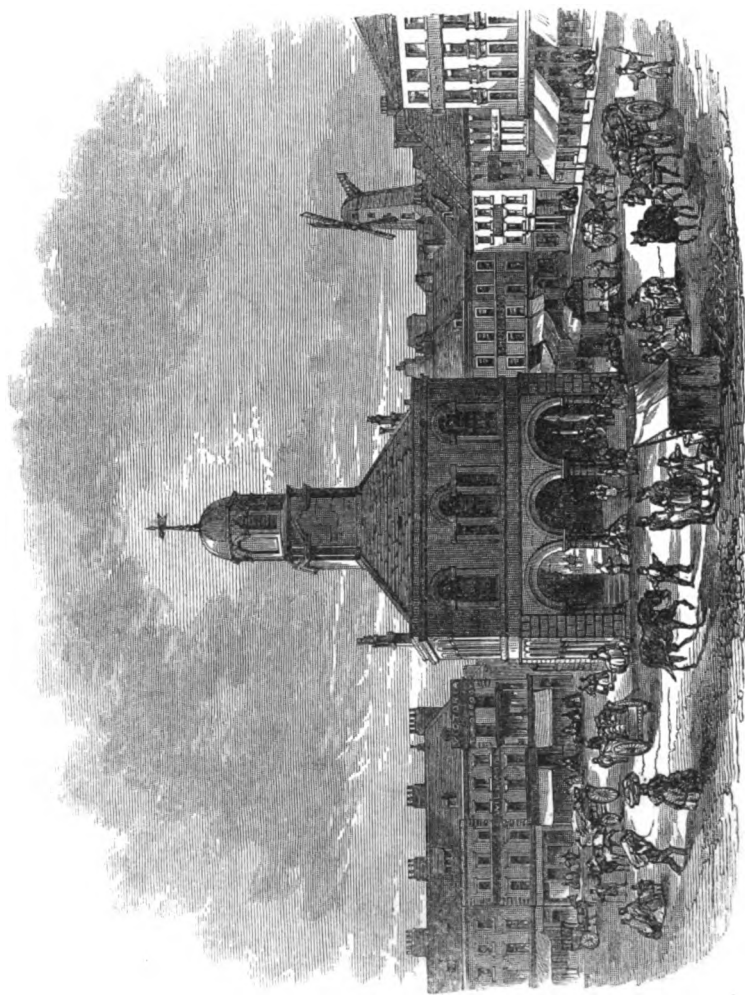
MARSDEN ROCK.

The magnesian limestone formation is well developed in the vicinity of Sunderland. About midway between South Shields and Sunderland it is seen to great advantage, for not

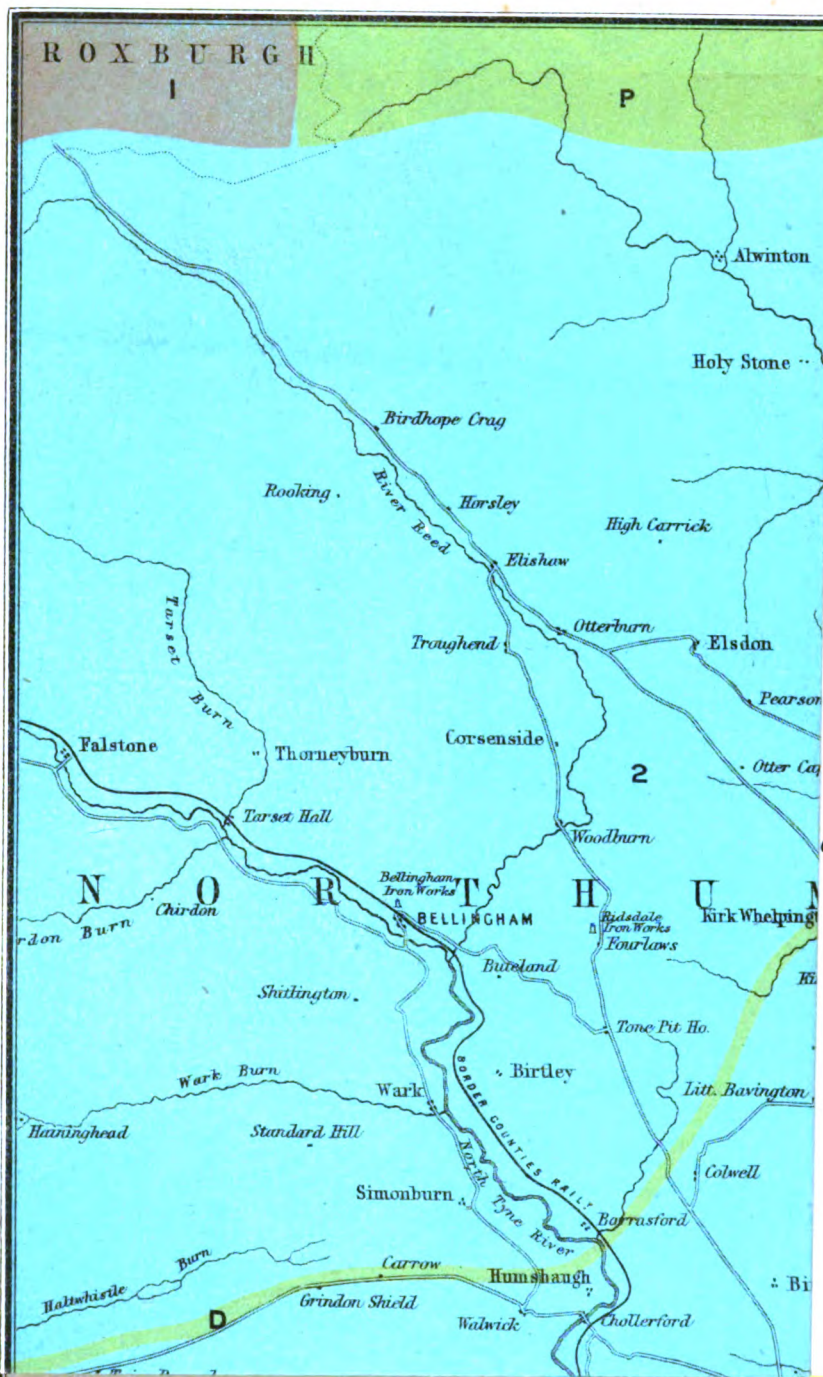
only do the cliffs rise high, but a huge mass of rock, having a very picturesque form, stands detached from the main land at a distance of about 100 yards. Marsden is a favourite resort of persons seeking a holiday. The wood-cut shows the rock. A walk either by the coast or the pretty village of Westoe brings the traveller to South Shields. The market place of this town is its chief architectural feature.

HEXHAM.

Reference has been made to Hexham in the account of the Tyne. This delightfully situated town which retains so much of the venerable rust of antiquity is easily reached by railway. Wilfred's Saxon church, built about 674, was destroyed by the Danes in 867; the crypt only remains. The present Priory Church, which is a beautiful specimen of the early English style was built at the close of the twelfth century. The nave was destroyed by the Scots in 1296. The manor court, and the square tower on the edge of the hill, are castellated remains of considerable interest.



Market Place, South Shields.



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INDUSTRIAL RESOURCES OF NEWCASTLE AND ITS NEIGHBOURHOOD.

BEFORE entering upon this sketch of the industry of the district of which Newcastle, from its antiquity and its importance, may be considered the metropolis, it will be advisable to devote a word or two to a description of those geological features of the country upon which its position in a manufacturing point of view is so entirely dependent.

Generally speaking, the strata rise in a northerly direction, *i.e.*, commencing at the north of Yorkshire, and travelling towards Berwick-upon-Tweed, the outcrop of the various mineral beds are passed over in succession: first we meet the uptilted edge of the oolite and lias; afterwards the new red sandstone and the magnesian limestone, the coal formation, and mountain limestone succeed in regular order. On the other hand, in pursuing a direction from east to west, the upraised edges of the measures are also met with, rising towards the west. This compression, as it were, of so large a geological range, within a distance of 40 or 50 miles, exercises a most important influence in the development of our industrial resources, by bringing within a very short distance, comparatively, the various minerals found in the different strata above mentioned. To these advantages is added another, *viz.*, the flowing of three navigable rivers—the Tyne, the Wear, and the Tees—through the district, thus providing the miner and manufacturer of the north with ready outlets to all parts of the world for their bulky and ponderous merchandise, which is estimated by hundreds of thousands, indeed by millions, of tons.

COAL.

In arranging the order of description, it is proposed to commence with that section upon which all the others are more or less dependent, and pursue our way, taking to some extent

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the relative importance of each as our guide. It is almost unnecessary to say that the foundation of the commercial greatness of the North of England is laid among the extensive beds of coal of a very excellent and very varied description, found lying in the carboniferous measures of the country we are surveying. The natural inclination or rise of the strata, and their intersection in various directions by valleys of rivers or streams of lesser importance, would make known to the least observant the existence of the mineral treasures of this neighbourhood. Accordingly the remotest historical accounts we possess, afford no indication of the commencement of working coal. At that time mining could be pursued in various localities by driving insignificant galleries in the sides of the hills which surround the town; and no doubt for a very long period, looking at the small requirements for fossil coal, this simple kind of mining would suffice. The Rev. John Hodgson, in his *Picture of Newcastle*, states that in the calcareous floors of the Roman baths, at Lanchester, and at several of the stations on the Roman Wall, coal and coal cinders are intimately mixed with the substance of the floor; and Wallis, in his *History of Northumberland*, alludes to large coal cinders being turned up within the walls of Magna or Carvoran in 1762. Coal, according to Pennant, was known to the ancient Britons in Wales, and there is no reason why, in our own neighbourhood, its existence should have remained undiscovered. That the Romans, at all events, were acquainted with the fact, we have already seen, and this takes us back well on to 2000 years.

The limited demand, however, for fuel of any description, and the facility with which this demand could be satisfied from the extensive forests which at former periods covered the surface of our country, would render our ancestors entirely independent of mineral fuel. The late Mr. Thos. John Taylor, in an excellent paper on the *Archæology of the Coal Trade*, sets down its commencement as a distinct branch of commercial enterprise, as dating from the 12th century.

A reference to Brand, Hodgson, and the authorities quoted

by them (a), shows us that Henry III., in 1239, granted to the good men of Newcastle licence to dig coals and stones in the Castle-field and the Forth, in aid of their fee-farm rent of £100 per annum; and in 1245, from an inquisition preserved in the Additions to the History of Matthew of Paris, sea coal (*carbo maris*), is not only spoken of, but also the wages of the persons employed in making pits to dig it from; and in 1280 the revenue of Newcastle had so much increased by the sale of coal that it was worth £200 a year. So great was the use of coal in London, in the year 1306, that Parliament complained to the King of the air being infected with noxious vapours; and, in consequence, all furnaces and kilns in which it was used were ordered to be destroyed. In 1325 mention is made of a vessel trading to Newcastle from France, and returning freighted with coals. In 1330 the Priory of Tynemouth let a colliery at "Elstewyk" for £5 a-year. This, and one or two others, were let in 1530 for £20 a-year, on condition they should not draw more than 20 chaldrons in one day; and in 1554 Queen Mary granted a lease for twenty-one years of the mine in "Elstwick," at an annual rent of £68. In a survey of the manor of Collierly, in the parish of Lanchester, in 1333 and 1345, mines of coal and iron are spoken of. Edward III. granted licenses to work coal in the Castle-field and Castle-moor, and suffered coals, won in the fields of Gateshead, to be taken across the Tyne in boats to Newcastle, on paying usual customs of the port, and thence to any part of the kingdom either by land or water, but to no place out of it, except to Calais. That the coal used was got near the surface may be inferred from the fact, mentioned in the Northumberland Household Book, that the "coyles will not byrne withowte wodd." In 1582 Queen Elizabeth obtained a 99 years' lease of the manor of Gateshead at the yearly rent of £90. By the Queen it was transferred to the Earl of Leicester, and ultimately it came to the Mayor and Burgesses of Newcastle. In 1615 the coal trade employed 400 sail of ships,

(a) History of Newcastle, v. I., p. 252; Picture of Newcastle, p. 218, &c.

and foreign vessels besides conveyed coal to France, Germany, Holland, &c. In 1622 the vend was 14,420 tens of 21 tons each, according to Mr. T. J. Taylor, equal to 302,820 tons (a). In 1649, Grey, in his *Chorographia*, speaks of many thousand people being employed in the working of coal—one coal merchant alone having as many as a thousand workmen. In that time, even, the trade was of an uncertain character, for Grey speaks of many adventurers in coal mining, in his day, dying beggars. One, a Mr. Beaumont, brought £30,000, and “within a few years consumed all his money, and rode home upon his light horse.” In 1655 three hundred and twenty coal keels were employed on the Tyne, each carrying eight Newcastle chaldrons. Brand states, in 1699, 14,000 ships were engaged in carrying 300,000 Newcastle chaldrons of coals to London, of which two-thirds went from Newcastle, and the over-sea trade occupied 900,000 tons of shipping annually. From 1704 to 1710 the average foreign export from Newcastle was 178,143 chaldrons per annum, and from Sunderland 65,760. In six years, ending 1776, there were cleared at the Custom House, Newcastle—

	Chaldrons.
For London	260,000
Other British Ports	90,000
British Colonies	2,000
Foreign Ports	27,000
	<hr/>
	379,000

By the year 1810 this was increased to 641,834 chaldrons. The gradual increase in the supply had been effected by progressive improvement in the means of obtaining the coal. In the first instance, pits were sunk to a depth which the machinery for pumping, as then in use, would regulate. As this improved, increased depths would be reached. Newcomen and Crawley, in 1710, were the first to apply the agency of steam usefully to drainage, requiring, however, the intervention of manual labour to open and shut the valves, until a Newcastle man, of the name of Beighton,

(a) Mr. Hodgson calls this 14,420 tons, but tens are evidently meant.

constructed one to do this by its own motion. According to Mr. Thos. J. Taylor, who quotes a writer of the name of Stewart, in 1714 there were only four steam engines in existence, and of these two were upon mines at Newcastle.

About the end of last century, the discoveries of James Watt inaugurated an era in the history of steam machinery, which, as far as mechanical force itself is concerned, enables the miner to overcome every obstacle offered by depth alone. This and other improvements in grappling with the difficulties and dangers encountered in mining, as well as in conveying the produce to the port of shipment or to the market itself, have enabled the coalowners of this district to supply, for every kind of use to which it is applied, during the past year, 1862, above 20,000,000 tons of coal.

A few particulars respecting the difficulties and dangers in sinking pits and working coal will not be without interest, even in so general a description as the present. The position of the various beds of coal in the Newcastle and Durham Coal-fields is now pretty well understood; nevertheless, the seams themselves are so liable to change, either in quality or by the interposition of worthless bands of shale, &c., that some risk always attends a new winning, even in a well-explored neighbourhood. Occasionally, also, the relative position of the strata is much altered by extensive slips or dykes as they are termed. One, known as the Ninety-fathom Dyke, although it frequently greatly exceeds this in extent, is a dislocation commencing at Cullercoats, and running in a westerly direction, throwing down the strata from 90 to far above 100 fathoms on the north side. To clear up as far as possible any uncertainty respecting the value of a coal-field, bore-rods are used, by which, with great labour, a boring tool is made to pierce the strata, bringing up from great depths samples of the different rocks, with sufficient character to enable a practised eye to judge of the results. Bore-holes, Mr. Stott, an experienced borer, informs the writer, have been put down 128 fathoms in depth by himself, and at a cost of £750.

The sinking of pits or shafts, as they are called, is a sub-

ject of great uncertainty as to expense, and of great anxiety to the mining engineer. Under favourable circumstances a few thousand pounds may suffice to overcome all obstacles, at other times a hundred thousand will not enable the adventurers to reach the coal. The Murton Winning at South Hetton, was attended with difficulties of such unusual magnitude as to merit a word or two. At this place the magnesian limestone overlies the true carboniferous series, and is 76 fathoms thick. It has, of course, to be sunk through before the coal measures are reached. Immediately underneath the magnesian limestone lies a bed of sand, varying in thickness, and in the quantity of water it contains. Mr. Edward Potter, under whose direction the operation of sinking was carried on, states in the Transactions (Dec. 5, 1856) of the Mining Institute, that when they were nearly through the limestone, so great was the pressure of the water, that the bottom of the pit blew up like a blast. This bed of sand was about 30 feet thick, and such was the volume of water which issued from its springs, that steam engine after steam engine was placed on the pits, until their united power amounted to 1,584 horses, raising to the surface 9,306 gallons, or above 41 tons of water per minute. It is said that not less than £300,000 was spent in vanquishing the difficulties which this bed of sand, added to those ordinarily met with in sinking to the coal. Here, as is usually done, to avoid the continued expense in pumping the water tapped by the shaft from the different strata it passes through, the pits were lined with segments of cast iron, forming a tube the diameter of the pit, of sufficient strength to sustain the immense pressure of the column of water which rises behind it. The Murton pits are 237 fathoms in depth, and required a little above two years for sinking.

The deepest pit in the north is that at Monkwearmouth, viz., 300 fathoms, and in sinking which, a very large sum was expended. The temperature at the workings stands at 85° to 90° F.

When a colliery is finally won, the dangers attending the

extraction of the coal are more than equal to those encountered in sinking the shaft. Water is still a serious obstacle. Not only have the regular feeders of the coal workings to be provided against by the erection of gigantic pumping engines, occasionally of from 100 to 300-horse power, but instances are not wanting of working collieries piercing ancient or even modern excavations adjoining, and becoming suddenly inundated. Willington Colliery, only a few years ago, shared this fate, and many thousands of pounds were sacrificed in its destruction; but far more dismal were the consequences which befel one of the Heaton pits, which in 1815 became similarly flooded, and the water rising in the workings, imprisoned 75 human beings, who were shut up in its gloomy galleries, and were not reached until several months after the spark of life had fled. According to Mr. T. J. Taylor, the quantity of water lifted from our mines exceeds in weight that of the coal. In many cases, seven or eight times the weight of coal is raised as water, and in one or two instances the weight is thirty times that of the coal. Accidents from water, however, are generally easily guarded against by proper pumping engines, and, accordingly, few casualties arise from its inroads; but imprisoned in the substance of the coal itself, or occasionally pent up in crevices of the strata are vast volumes of a highly inflammable air, not identical in nature with, but greatly resembling the ordinary coal gas used in our houses and streets. When the pressure is removed which keeps it back, it escapes with varying degrees of velocity according to the state of the barometer, for a change in atmospheric pressure is sufficient to turn the scale of those conditions which restrain its moderate liberation. At other times on the pitmen piercing the crevices which contain the fire-damp, as it is called by miners, the gas rushes out, forming the "blowers" of the pitmen. Sir Humphrey Davy undertook a very extensive and elaborate series of researches into the nature of this gas, and he found when mixed in the proportions of from two to four times its volume of common air, it burnt without exploding, six to eight volumes

of air to one of the gas formed an explosive mixture, from which proportions its violence in exploding gradually decreased, until fifteen of air and one of gas are mixed, when it ceases being inflammable. Of the intensity of an explosion of any considerable quantity of such a mixture as has been described, those who have never reflected on, or studied the question, can have little idea. In the year 1860, an explosion took place in a steam engine boiler flue at Hetton Colliery, the capacity of which permitted an accurate estimate of the maximum quantity of gas which could have been involved in the catastrophe which ensued. The writer, whose calculation was confirmed by Dr. Richardson, and whose estimate of the effects was considered as reasonable by Dr. Faraday, gave evidence that only 7,000 cubic feet could have been present, and of this not above 1,000 cubic feet would probably be fire-damp. The devastation all round the scene of explosion was something beyond belief, until an examination, based on the known properties of such combinations, was gone into. Above twenty men and boys perished; some of whom, at a distance of nearly half a mile, were killed by the concussion of the air, and damage was inflicted on the mine which, in one way or another, caused a loss of £10,000 to the owners. When it is remembered that all the inflammable air that could be present was what might be distilled from $1\frac{1}{2}$ cwt. of coal, and only equal to one day's consumption for eight or ten argand burners, some faint idea may be conceived of the terrific nature of an explosion when not thousands, but hundreds of thousands, of cubic feet are made to yield their tearing force through galleries of considerable length. Then nothing can withstand the shock. Nor is this all. Destruction to animal life, as far as the explosion is concerned, is confined to a comparatively limited area; but the resulting gases consequent on the combustion of fire-damp, moving forward in the direction of the current of air passing through the mine, strike down men or horses during their entire course through the miles of galleries they may have occasionally to traverse.

The following is a list of some of the most destructive of the calamities arising from fire-damp, taken from the "Newcastle Chronicle" of 15th February, 1862.

					Lives Lost.
1710.	Bensham Colliery	..	..	..	70 to 80
1766.	South Biddick do.	..	..	..	27
1767.	Fatfield do.	..	..	..	39
1794.	Picktree do.	..	..	..	30
1799.	Lumley do.	..	..	..	39
1805.	Hebburn do.	..	..	..	35
1805.	Oxclose do.	..	..	..	38
1812.	Felling do.	..	..	..	92
1813.	Fatfield do.	..	..	..	32
1813.	Felling do.	..	..	..	22
1815.	Newbottle do.	..	..	..	57
1817.	Harraton do.	..	..	..	38
1817.	Rainton do.	..	..	..	27
1819.	Sheriff Hill do.	..	..	..	35
1821.	Wallsend do.	..	..	..	52
1826.	Jarrow do.	..	..	..	34
1830.	Do. do.	..	..	..	42
1835.	Wallsend do.	..	..	..	102
1836.	Hetton do.	..	..	..	20
1837.	Springwell do.	..	..	..	27
1851.	Washington do.	..	..	..	34
1860.	Burradon do.	..	..	..	76

The dangers which the miner has to encounter from the character of the atmosphere in which he gains his daily bread, are sought to be averted by well-organized systems of ventilation. To carry this out properly, two shafts are required, at the bottom of one of which is a powerful furnace. In principle this shaft, called the upcast, is converted into a chimney, *i.e.*, the heat from the furnace establishes a powerful draught up the pit. To supply the vacuum which this upward current necessarily leaves behind, fresh air is taken down the other, or downcast pit; but before the new air is taken to the furnace, by a series of doors in the galleries themselves, it is made to traverse the whole of the workings. The object to be gained by this process, being of course to dilute the inflammable gas far below that proportion in which it, with atmospheric air, constitutes an explosive mixture. To secure this, immense quantities of air are thus drawn down some of our mines.

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At Usworth, Mr. Matthias Dunn informs the writer, where 720 tons of coal are daily worked, 102,330 cubic feet of air per minute pass through the workings.

There are few instances where the influx of gas is sufficient to convert the whole of the usual ingress of ventilating air into an explosive mixture ; but it is easy to conceive that in a particular face of coal, the liberation of the fire-damp may be sufficient to render that portion of the ventilating current highly dangerous. Other precautions, in consequence, are required to guard against the results which follow when flame is brought into an atmosphere such as that we are describing. Candles as a means of light for the miner are, of course, under such circumstances, out of the question. About 1760, a Mr. Spedding suggested a contrivance called the steel-mill, by which a boy, who sat beside the workman, turned, by means of multiplying wheels, a steel rim, against which a flint was pressed. The light so obtained was feeble, but still sufficient to enable the miner to pursue his calling. A serious objection to the steel-mill, in addition to the weakness of its light, was the fact that the sparks from it did occasionally ignite the fire-damp. At this time the great chemist of his day, Sir Humphrey Davy, was called in to assist the mining engineers of that period with his advice. Acting as a philosopher, Sir Humphrey, before proceeding to the construction of a lamp, applied himself to solve the problem as to what the nature of the inflammable gas he had to deal with was. In following out this inquiry, he was led to continue his researches into the nature of flame ; and thus gave to the world those admirable essays which continue to be quoted as masterpieces of chemical investigation. Flame he demonstrated to be gaseous matter, rendered luminous by a great elevation of temperature. Apply any substance to flame capable of robbing it of its heat with sufficient rapidity, and the luminousness disappears ; in other words, the flame is extinguished. Metals being good conductors fulfil these conditions admirably, so much so, that metallic gauze, having 700 to 800 apertures to the inch, still possesses sufficient metal in its substance to

cool down flame ; hence, on placing such a piece of gauze on the top of the flame of a candle, the flame itself is extinguished above the point where the gauze intersects the columns of ascending gas. That the extinction of the flame is not owing to the absence of gaseous matter may be proved by igniting the gas which passes through the gauze unconsumed. The apertures of the gauze which thus forms the covering of the safety-lamp, or Davy as it is called, permit ingress of air, egress of the gases produced by the combustion of the oil, and sufficient passage of light. The lamp can be used in an atmosphere so combustible as to keep up a series of explosions within the gauze until it gets red hot, without communicating ignition to the external air ; this, and the fact that the flame assumes a peculiar appearance in the presence of air mixed with fire-damp, renders it invaluable to the miner, both warning him of the approach of danger and preserving him when surrounded by it. It is only due to George Stephenson to mention that he, whilst Sir H. Davy was engaged in his researches, did also produce a lamp, depending on the application of similar principles to those discovered by the man of science.

Neither the influx of water nor the inroad of gas, however, exhaust the perils to which those who are engaged in coal mining are exposed. Sudden falls of stone from the roof of the seams, accidents in travelling up and down the shafts to work, all tend to swell the aggregate of loss of life, which, according to recent statistics, amounts to about one per 100,000 tons of coal worked. The Hartley calamity is still fresh in every one's memory, in which the sudden breaking of a huge beam of cast-iron, falling across the pit, hermetically closed up 202 men and boys by shutting up the only means of escape, until after several days of indefatigable labour, the only reward was restoring so many corpses to the unhappy relatives.

The numerous body of men, to whose industry society owes so much of its comfort, and this nation so much of its greatness, are a peculiar class. Physically, owing probably to their being employed in places where they cannot walk

or stand upright, and in darkness, they are generally easily distinguished from the remainder of the labouring class. Living, too, as they almost invariably do, in isolated villages, near the mines, solely occupied by pitmen, has tended to keep them apart from workmen of other pursuits, and thus to preserve not only any physical peculiarity, but also dialect and customs. In education, as a body, they are perhaps below the standard, owing, no doubt, to the early age at which they commence working. The operations of the Wesleyans, in establishing Sunday schools and chapels, have afforded great facilities for moral improvement; and it is only due to the miners to say they have gladly availed themselves of the means placed within their reach, and have always willingly contributed to their support. In providing against sickness, they are at least perhaps as prudent as their fellow labourers in other branches of employment. Their domestic habits are generally cleanly, and their dwellings usually evince considerable attention on the part of the women to the comfort of those who are exposed to a life which most workmen would look upon as intolerable.

According to the Government statistical returns contained in the Geological Survey for 1861, there is in the North of England Coal District 271 collieries, which are to some extent under the supervision of two Government Inspectors. The duty of these officers is, when requested by the workmen or others, as well as at their own pleasure, to visit the different establishments in their respective districts, in order to ascertain whether certain government regulations in reference to machinery, ventilation, &c., are properly observed. More particularly is their presence required to look into the circumstances connected with, as well as to assist at the investigation consequent on any accident involving the loss of human life. By a recent enactment, every colliery in working order is compelled to be provided with two shafts, unless specially exempted from this legislative clause. Proper ventilation, as well as means of escape from the mine in the event of an accident preventing egress from the workings, as was the case at Hartley in 1862, are thus secured.

Various opinions are expressed as to the wisdom of this Government interference. In principle, it is no doubt useful, according to the views of some, to adopt such precautions as will prevent unnecessary risks from mistaken motives of economy, or from want of judgment on the part of colliery owners. But, at the same time, others allege, it may be equally imprudent to impose on those who embark their capital in coal-pits such restrictions and regulations as virtually to remove from their shoulders that proper degree of responsibility which ought to rest there.

The number of men engaged in working coal varies much with its character as to hardness, height of seam, and other circumstances. At the Haswell pit, according to Mr. T. J. Taylor, 428 men and boys were required underground for an annual produce of 200,000 tons; while at Towneley colliery, according to Mr. Simpson, 179 worked 100,000 tons. The average of the two would be 196 per 100,000 tons of coal worked. Calling it 200 men and boys, 22,000,000 of tons of coals would give us 44,000 persons engaged in coal mining. In 1829, according to Mr. Buddle, a great authority in the Coal Trade, for 8,491 persons engaged underground, there was employed, exclusive of keelmen, 3,463 above-ground. If similar proportions still hold good, the 44,000 persons now working in the pits, will afford employment for about 18,000 above-ground, giving a total of 72,000 persons labouring in and about our collieries.

In 1852, Mr. T. J. Taylor considered 38,933 men and boys were engaged above and below ground, at a time when the produce was about 14,000,000 of tons. This on 22,000,000 would give 61,000 persons as the number employed. In 1844, the "Newcastle Journal" contained a statement giving 33,990 persons per 9,623,922 tons. This would make between 75,000 and 80,000 as the probable number now engaged.

Adopting the figures of Mr. T. J. Taylor, in 1852, as a basis of calculation, when steam engines of 21,940 horses were employed in this coal-field, for 14,00,000 of tons, there ought to be 34,477 horse power engaged in the present

output of say 22,000,000 of tons. Recently Mr. T. W. Jobling has adopted a small locomotive for underground work, to supersede the horses and ponies engaged in drawing the coal to the bottom of the shaft.

In 1854 the output of coal in our district was, according to Mr. Robert Hunt, (Geological Survey) 15,420,615 tons. At that time Mr. T. Y. Hall assumed £13,000,000 of capital to be embarked by the coalowners in their undertakings; so that, if this calculation is correct, something like £20,000,000 sterling must now find employment, exclusive of that required for railways, shipping, &c.

The coal is usually worked, not by the landlord or owner of the royalty, but is leased to the colliery owner, who pays a rent of about 6*d.* per ton to his lessor.

At the present day, small coal is sold "on board" in the river at about 3*s.* a ton; unscreened, *i.e.* as the coals are worked, 5*s.* to 6*s.*; and screened at 6*s.* to 7*s.*

When the coal is being wrought from an extensive royalty, the pits are not unusually placed at different points as the workings extend, by which economy in underground carriage and improved ventilation are secured. Generally, however, there is among these winnings as they are called, one which is more extensive than the rest, and this in a large colliery is an establishment of great importance. The extended beam of a huge pumping engine is often seen projecting through the massive masonry of a strong but not very elegant engine-house. The weight of the water to be set in motion at every stroke is great, 30 to 50 tons and upwards, besides a great weight of pumping machinery. The movement of the engine is, consequently, slow, 5 to 10 strokes a minute. The pumps themselves are either in a shaft apart, or in a portion of a pit separated by a wooden partition, or brattice, as the pitmen call it. Close to them will be one or more pits for drawing the coals,—these are provided with steam engines, varying in power, according to the depth of the coal and other circumstances. Engines for this purpose of 100 and 150 horse-power are not uncommon, capable of bringing up 1000 tons a-day and upwards. Of these shafts, one at least will be

seen sending forth considerable volumes of smoke—this is the ventilating or upcast shaft, previously alluded to. The coals when drawn up, are received by the “banksmen” in the small wagons into which the hewer has loaded them, and are tumbled over the “screens,” by which the smaller coal is separated from the rest. Formerly, to suit certain markets at a distance, the amount of this small coal bore so large a relation to the demand for it by manufacturers, that hundreds of thousands of tons accumulated at the different collieries, and heating spontaneously, took fire, and illumined the country for miles around. At that time, any quantity of such coal could have been obtained at 1s. 6d. to 2s. a ton, put into boats on the river, and as it possessed sufficient heating power to serve for several purposes, rise was given to extensive works, where cheap fuel was an element of success. Manufacturing enterprize, however, has in recent times extended in the coal district so rapidly, that the demand for small coal has increased in a corresponding degree, and in consequence, the price is now twice that which it was in former years. When the impurity of the small coal is such as to interfere with its use for manufacturing purposes, a process of washing, similar in principle to that adopted for separating metallic ores from their matrix is pursued. One gentleman, Mr. J. Morrison, to whom the credit is due of having first introduced, in 1851, an invention of French origin, saves from destruction 150,000 tons annually, of what otherwise would be useless coal.

In addition to the pits themselves and their accompanying erections, every colliery possesses a large establishment of shops for joiners, smiths, engine-fitters, &c., to attend to those necessary and very extensive repairs to the large plant involved in such a concern as that under consideration.

Little attraction as a descent into a coal-pit offers to a stranger, it is a matter of easy accomplishment. Instead of the old baskets, or corves as they were called, or the less inviting loop in the chain, both men and coal are drawn by means of the cage, which is a frame of iron with a platform,

guided by vertical rods of wood, rendering the motion perfectly steady and easy. Into it persons step, or the small wagons or tubs filled with the coal, as worked by the hewers, are placed. A rope, now generally of wire, attached to the cage, passes over large pulleys erected over the mouth of the pit, and by means of the powerful winding engine, the cage and its contents are, in a few seconds, drawn to bank,—an empty one at the same time descending in another compartment of the pit. In former years, a great loss ensued from the corves striking the sides of the shaft, and a considerable portion of coal was thus thrown down the pit.

The bottom of the pit ends in a small cavern or excavation, and from it, in the coal itself, or partly in coal and partly in stone, if the former is not high enough, run in different directions the roley-ways or chief galleries sufficient coal being left all round the bottom of the pit to prevent any subsidence which might damage the shaft or affect the engine-houses at the top. At a proper distance from the pit bottom, galleries are driven about six feet wide; and at right angles, others of a similar character. The contents of these galleries, extracted by pick and gunpowder, afford the produce of the colliery, and the effect is, that the seam ultimately is so perforated, that square masses of coal are left standing, called pillars or broken coal. These pillars, along with the use of props of wood, serve to support the roof of the seam. When the extent of the royalty, or its extent in any one direction has been thus treated, the pillars themselves are removed, and the superincumbent strata settle down, causing what is locally known as a creep. Deep as the mine may be, and small as the amount of subsidence is—only the thickness of the seam—the disturbance is felt on the surface. Such a creep took place from the workings of Tyne Main Colliery, and so affected the docks of Messrs. Smith, at St. Peter's, that some thousands of pounds of damage ensued.

On the railways, which abound in such a locality as is attempted to be described, are seen great rows of simply constructed wagons, waiting to be filled, in the act of being

loaded, or ready to be removed with their valuable contents.

The progress of the method of bringing coals from our pits is interesting, ending as it has done, in that system of transport of merchandise and people, which has superseded all modes of land carriage, and not unfrequently competes successfully with that by water. According to Mr. Thos. J. Taylor, in 1367, all the produce of the collieries was conveyed away on the backs of horses. This primitive mode of carrying coals to be loaded in the river, gave place subsequently to carts, of which Grey, in his *Chorographia*, speaks of as many as four and five-hundred being employed at one colliery. Somewhere between 1602 and 1649, but the exact date neither Mr. Nicholas Wood (*a*), nor Mr. Thos. Jno. Taylor, can determine, bars or "rails" of wood, or Newcastle Roads as they were called, were laid down to diminish friction, and at the same time, or soon after, a wagon was constructed very much like that of the present day. These wooden rails, occasionally protected by a thin strip of iron, to prevent wear, were used exclusively for one-hundred and fifty years, indeed the writer remembers within, perhaps, twenty years, seeing them in use in the Garesfield Colliery railway. Cast iron rails were the next improvement, and the first authentic account we have of their manufacture is at Colebrook-dale, in 1767, but Mr. N. Wood, speaking on the authority of an anonymous author, states that they were proposed and used as early as 1738. These, however, would be of the form known as tram-plates, for it was not until 1789, that Wm. Jessop, laid down on a public railway at Loughborough, according to Mr. T. J. Taylor, edge rails of cast iron. The writer recollects hearing, from the late Mr. Wm. Losh, of the outcry that was raised against this innovation, all the old enginewrights declaring the waggons would "run amain" on inclines so constructed. This prophecy was not unfrequently fulfilled; for in one case (at Pelaw Main, it is believed), as described, by an eye witness, to the writer, the first "set"

(*a*) *Practical Treatise on Railroads.*

of wagons did land on the deck of the ship, intended to receive their contents only. About 1794 according to Mr. Charles Nixon, and in 1805 according to Mr. N. Wood, malleable iron rails were used first at Walbottle Colliery, being square bars two feet long. In 1820, Mr. Birkinshaw obtained a patent for an improved form of malleable iron rail, resembling the one of cast iron. These were first rolled at Bedlington, and the Stockton and Darlington Railway was the first public line on which they were used in 1825.

The first motive power used for conveying coals on the railways was, of course, horses. Afterwards, when the loaded wagons were running down hill, by means of a rope, they were made to draw up the returning empty wagons—a mode which is largely followed to the present day. In 1808, a fixed steam engine was erected on Birtley Fell, to draw up the loaded wagons from Urpeth Colliery, and subsequently, similar engines have been employed, and continue to be extensively employed on colliery railways wherever gravity does not suffice, or the nature of the country does not permit, the use of locomotives, so that except in small collieries, horses are now rarely employed in the conveyance of coals.

For forty years previous to Trevethick and Vivian obtaining a patent for applying the steam engine to propel carriages on railways, several ideas had been suggested for its use, but these engineers were the first to put the idea into operation. Mr. Blackett, at Wylam, was the first to show that a locomotive engine was capable of moving with a load behind it by its own adhesion on the rail, a supposed defect which led to more than one patent for its suppression. In 1814, George Stephenson, a man born on the very line of railway where Mr. Blackett's engines were running, constructed the first engine with two cylinders at Killingworth; and at Walker Iron Works, in concert with the late Mr. William Losh, he improved and constructed locomotive engines for Hetton and other colliery railways. The "Athenæum" newspaper, in its impression of November 8, 1862, censures Smiles, the Biographer of Stephenson, for omitting, (among many other

blunders), all mention of "Stephenson's long and lucrative engagements at Losh, Wilson and Bell's, where some of his early triumphs were achieved."

So little confidence was placed generally in the still immature powers of the locomotive, that in 1828, when a deputation from the Liverpool and Manchester Railway, then in process of construction, visited the colliery district under review, its application was all but rejected by the directors, and probably no circumstance in connection with Stephenson's career more signally indicates the powers of his mind, nor has been followed by more important results, than the determined stand he made against the adoption of any other form of traction than the locomotive, which at that time was still but an imperfect machine. Stephenson perceived in it the germs of future success; his counsels prevailed, and step by step, the old colliery "steam" or "iron horse" of the Newcastle coal pits has effected a social revolution of unheard of magnitude.

To return from this digression, let us follow our coals to the river—here formerly they were, and still in some instances are, shot on board the vessels waiting to convey them to all parts of the world, by means of spouts or shoots; now generally however, the wagon itself is lowered by a very ingenious system of counter-balance weights to the varying level of the decks of the ships; the bottom of the wagon falls back, and its contents are gradually discharged into the hold.

There is no part of this important branch of British enterprise which has undergone greater modifications than the mode and cost of conveyance. In early times coal was carried to London in very small ships, but according to Mr. T. J. Taylor, who quotes from an original list of ships he possessed, in 1636 the average quantity of coals carried by vessels employed in carrying 4000 chaldrons, was $8\frac{1}{2}$ keels, or about 175 tons.

The following statement, copied from Edington on the Coal Trade, printed in 1813, gives the freight made by a vessel of 22 keels of Russell's Wallsend coals, and at the same

time gives some particulars of the state of the Coal Trade of that period, so curious as to merit insertion.

176 chas. of Wallsend Coals at 34s. per Newcastle chal. ..	£299	4	0
Spoutage on 112 chals. at 6d. ..	£2	16	0
Keel dues on 64 „ at 13s. 4d. per keel ..	5	6	8
Beer and bread money to keelmen, 3s. 10d. ..	1	10	8
			<hr/>
Coast duty and certificate, 1s. per chal. ..		9	13
Lighthouses		8	16
Newcastle Corporation dues, at 3d. per chal. ..		6	16
Insurance on £326 14s. 6d. at 1½ guinea per cent., and		2	4
2s. 6d. per cent. duty		5	3
			<hr/>
	£331	17	6

CHARGES IN LONDON RIVER.

Sundry dues	£4	1	0
Metage and Orphan dues 1s. 2d. per London chal. on 343 chals. ..	20	0	2
King's duty, 12s. 6d. on 343 chals. ..	214	7	6
Discount, &c.	9	18	0
Factor's commission 1½ per cent. on £876 11s. 1d. ..	4	7	7
			<hr/>
Freight	252	14	9
	291	18	10
			<hr/>
	£875	11	1

This gives per ton about the following figures :—Coalowner

for coals at spout	0	12	9
Expenses in the Tyne, &c.	0	1	1½
Coast Duty	0	0	4½
			<hr/>
	£0	14	3

DUES IN THAMES DISTRICT, &c.

Freight	0	1	8
King's duty	0	11	1
			<hr/>
Freight	0	12	9
	0	12	7
			<hr/>
	£1	19	7

This account shows a state of things which would prevent the horse of either coalowner or shipowner having the light load Master Beaumont's steed had when he carried away his master, after losing his £30,000 in coal mining.

With cheaper money than the days Edington speaks of, our colliers are obliged to be content with 5s. or 6s. per

ton freight. In addition to the large fleet of sailing vessels performing their ten or a dozen voyages in the year, there is a large number of screw steamers constantly in the coal trade. Of these, the Killingworth, of 425 register tonnage, made during the year 1862, sixty-five voyages, conveying during that period, the enormous quantity of 38,739 tons of coal.

Besides the sea, as a means of transit, there are now daily forwarded to London enormous supplies of coal by rail at a cost of about 11s. per ton—high when compared to freight by ships; but, by avoiding other charges of unshipping and delivery, railways are able to maintain an important position in carrying coal to the metropolis.

The extensive use and prominent position of coal in our commerce rendered it at early periods too conspicuous to escape being the subject of taxation. Mr. Thos. J. Taylor says the first notice we have of a duty on coal was in 1379, and in 1421 the Sovereign complained that the Crown had been defrauded in the collection of a duty of 2d. per chaldron on all coals sold to persons not franchised in the port of Newcastle. The payment itself got into arrears, when it was settled that, instead of paying up these, a duty of 1s. per chaldron on sea-borne coal should be levied. After the Restoration, this duty was settled by Charles II. on his natural son Charles, Duke of Richmond. In 1799, the Government became its possessor by paying the Richmond family £19,000 a year, which annuity was subsequently converted into stock in the 3 per cents. of the amount of £633,333 6s. 9d. This shilling continued to be levied on all coal sent from the Tyne until 1831, when it was abolished. In the reigns of Elizabeth and James, duties amounting ultimately to 8s. 4d. per chaldron were laid on coals sent abroad. After the great fire in London, 3s. a chaldron was laid on coals for re-building the city. In 1670 and 1677, duties reaching 5s. a chaldron, chiefly for re-building churches were imposed. In the late war, 9s. 4d. per London chaldron was the Government duty on coals, and so late as 1830, the tax amounted to 6s. In London there are still certain municipal charges of an onerous

character, which in 1850 amounted, in the aggregate, to £175,911 15s. 6d.

To any one who recognizes the entire commercial dependence of the country on the existence of the valuable beds of coal it possesses, the question of the probable duration of our coal is one fraught with the deepest interest. The earliest prophecy probably we have on the subject is that of Sir George Selby, who, in 1610, gave it as his opinion that the coal mines would not hold out for 21 years. Since that day calculations have been made in which exhaustion varies from 200 to 2000 years. The problem itself is involved in many disturbing influences, rendering it one of great difficulty. Various obvious circumstances tend to complicate the enquiry. The limit of the coal-field north and west may be assumed as ascertained, and the sea on the east assigns a boundary, practically speaking, in that direction; but to the south, where the coal measures dip underneath the magnesian limestone, much remains to be investigated. Do the coal seams rise up as they appear to do in some places, and are finally and completely cut off by the magnesian limestone? or is it merely the summit of a ridge, which soon after dips to the south, bringing back the coal seams? Or admitting them to be brought back, does the magnesian limestone, and following it the new red sandstone, preserve in their ascertained rate of dip, their normal thickness? If they do so, then, although coal may exist over an extended area, it may be reasonably feared that much of it will be beyond our reach from its great depth. Not that mechanical means might not be applied to overcome this, but the increasing temperature in deep pits will probably offer an insuperable barrier to their being worked. Monkwearmouth Pit is 300 fathoms, and in it, at a temperature of nearly 90°, the men toil at their labour quite naked. Competent viewers have assured the writer that were the coal hard in that mine instead of soft, the pitmen would be unable to work. Mr. Fairbairn, in a mine at Manchester, 340 fathoms deep, ascertained the increase of temperature was 1° for every 50 feet, so that at a depth of 400 fathoms, taking Monkwearmouth as our guide, the ther-

mometer would stand at near 100°. Again, the constantly increasing annual rate of consumption baffles any computation, assuming the extent of coal to be accurately known. Suppose such a calculation to have been made in 1810, when the production of the district would be from 2,250,000 to 2,500,000 of tons, what becomes of it in the years 1859, 1860, and 1861, when, according to the Government returns, collected by Mr. Robt. Hunt, the coal furnished by our mines here had risen to 16,000,000, 18,250,000, and 19,250,000 of tons respectively for these three years?

By the kindness of Mr. John Taylor, the writer has been furnished with the names, depths, and thicknesses of the various coal seams of the northern field. They are known under different terms on the Tyne and Wear, but both are given, as well as the other particulars for both localities.

TYNE.					WEAR.				
SEAM.	Distance between Seams. Fthms.	Average depth from surface. Fthms.	Thickness. Ft. In.		SEAM.	Distance between Seams. Fthms.	Average depth from surface. Fthms.	Thickness. Ft. In.	
1 High Main	—	60	6	0	Three-quarter	—	60	3	6
2 Grey Coal..	12	74	4	0	Five-quarter..	14	74	5	0
3 Yard Coal..	10	84	3	0	Main Coal ..	11	85	5	6
4 Bensham ..	12	96	4	8	Maudlin ..	11	96	3	3
5 Tyne Five-gr.	19	115	2	8	Low Main ..	10	106	4	0
6 Low Main	6	121	5	0	Hutton Seam	14	120		
RYTON.									
7 Five-quarter	—	14	3	8	Beaumont ..	22	142	2	9
8 Engine Coal	22	36	3	10	Not found ..	—	—		
9 Main Coal	15	51	2	9	„	—	—		
10 Horsley } Wood, or Brockwell }	16	67	3	2	Brancepeth and Byers Green }	25	167	4	0
Total thickness....									
38 9					28 0				

Mr. Edward Hull, in his work on the Coal-fields of Great Britain, gives the thickness of coal in our district, beyond the magnesian limestone, at 36 feet, contained in about 10 seams, above 2 feet thick; and that under the Permian and Trias rocks, at 24 feet, of workable coal.

Mr. Hugh Taylor, in 1829, gave it in evidence before the House of Lords, that there was an average of only 12 feet of workable coal.

Mr. T. Y. Hall's calculation of the extent of the field and quantity of coal in it, appears to assume an average of 11·25 feet only as of workable thickness.

The area of our coal-field has been variously estimated by different authors. In 1829, Mr. Hugh Taylor (*b*) calculated that it extended over 243 square miles in Northumberland, and over 594 in Durham, making in all 837 square miles. Mr. Taylor considers its southern limit to be defined by a line running from Castle Eden to West Auckland.

Mr. T. Y. Hall, in a tabular statement given in a paper on the Northern Coal-field, in Vol. II. of the North of England Institute of Mining Engineers' Transactions, makes the total area as comprising 750 square miles.

Mr. Hull gives as the area of actual coal-field beyond the magnesian limestone, 460 square miles, and under the Permian and Trias, 225, together 685 square miles. This writer includes within his limits all coal not more than 4000 feet deep.

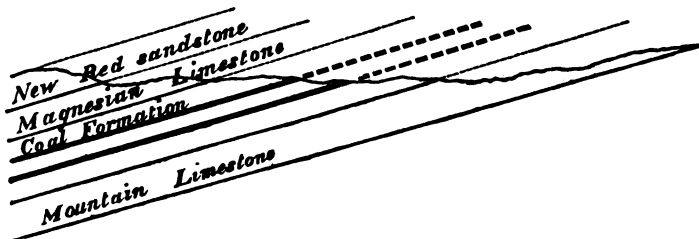
The specific gravity of coal varies, but, taking 1·25 as something like a mean of different samples, one square mile one yard thick would weigh 2,904,000 tons.

Mr. Hugh Taylor's figures would give 3,097,500 as the weight of this quantity, so that in round numbers, a square mile of coal one foot thick, weighs 1,000,000 tons.

The thickness of the different seams as given by Mr. John Taylor and Mr. Hull, amounting to an average of 30 to 35 feet, are reduced to the limits ascribed by Mr. Hugh Taylor and Mr. Hall, by the maximum thickness not extending over the whole of the area of the coal-field. The greater thickness would have been maintained throughout, had the beds been left in their original position, viz., horizontal. But, owing to the rising of the strata in more directions than one, the seams of coal come to the surface, or crop out as it is termed. It follows, then, that if ever a seam of coal was coëxtensive with one below it, that portion of the higher, which reached from the point of its actual outcrop to a

(*b*) House of Lords' Report, 1829, p. 124.

similar point of that underneath, must have been washed away in some of those great geological changes which have occurred on our planet. The sketch below may render this more clear. The horizontal line is intended to show the present surface of the country; the continuous lines the rocks actually remaining; and the dotted lines a portion of those supposed to have been washed away. Hence the numbers



require correction, from this general denudation, as well as from disturbances of a more local character. Of these latter may be cited the so-called "wash," extending from the city of Durham to near the Tyne, in a northerly direction, where the coal and other strata appear to have been washed away, as if by a water-course, and their place filled up with gravel. The original quantity of coal, as contained in our beds, would have amounted to above 20,000 millions of tons; but this, from the causes just mentioned, have been reduced to probably 12,000 or 13,000 millions of tons, taking Mr. Hull's mode of calculation as our guide. Mr. Hugh Taylor's figures bring out 10,370½ millions as the quantity of coal originally existing in our district, in its present geological condition; while Mr. T. Y. Hall considers 8,132½ millions of tons only would be left after the denuding process had taken place.

Attempts have been made to ascertain the quantity of coal already extracted from the locality in question. These the writer has endeavoured to bring up to the end of 1862.

Mr. T. Y. Hall, in a report on the subject already quoted, states that up to the end of 1847, it had supplied 152,000,000 of chaldrons.

B B

152 millions of chaldrons is close upon ..	Tons. 403,000,000
In 1846, Mr. Greenwell gives the produce at 10,000,000 tons; in 1854, according to the Mineral Statistics published by Government, it was 15,500,000 for 1848, 1849, and 1850, it may be assumed at 12,000,000 a year, say:	36,000,000
1851, 1852, and 1853 is taken at 14,000,000	42,000,000
According to Mr. Robt. Hunt, in the Government returns, the produce in round numbers was, in 1854, 15½ millions; 1855, 15½; 1856, 15½; 1857, 16; 1858, 16; 1859, 16; 1860, 18½; 1861, 19½ .. =	132,000,000
1862, supposed	22,000,000
Total	635,000,000

Taking as our guide the various figures given by the Rev. John Hodgson, Mr. Hugh Taylor, Mr. Thomas John Taylor, Mr. Robert Hunt, and others, the following form an approximative calculation:—

Extracted previous to the end of the 16th century ..	Tons. 40,000,000
Do. during 17th do. ..	40,000,000
Do. do. 18th do. ..	130,000,000
1800 to 1829, both inclusive	90,000,000
1830 to 1839 do.	50,000,000
1840 to 1849 do.	100,000,000
1850 to 1859 do.	148,000,000
1860 and 1861	37,000,000
1862 supposed	22,000,000
Total	657,000,000

So that probably 650,000,000 may be assumed as not very wide of the truth.

To this must be added, first, the previous waste of small coal, which Mr. T. Y. Hall reckons as equal to one-half of the total raised; and second, a similar amount for loss from barriers, dykes, creeps, &c., making, thus, a weight of lost coal amounting to that really of service.

Mr. Hugh Taylor estimated, in 1829, the loss from both these causes at one-third—*i.e.*, for 3 tons got, only one is lost—looking to the future; whereas Mr. Hall's is retrospective. If we assume a mean, or something like a mean, between these, our 650 millions of tons, in round numbers, is swelled to 1000 millions as having been withdrawn from our resources.

Since these estimates were framed, a great improvement in coal working has been effected, and according to Mr. Wm. Armstrong, of Wingate, a gentleman of such experience as to entitle his opinion to great weight, the following ought to cover the waste:—

						Per Cent.
Loss by working, and small left underground	..	..	..	..	..	10
“ barriers, divisions to exclude water, &c., from adjacent	..	..	..	..	..	6
“ royalties	..	..	..	..	..	3
“ water	..	..	..	..	..	1
“ sundries, dykes, &c.	..	..	..	..	..	—
						20
						—

Practically, he considers one-fourth as lost.

The available coal left in the ground, according to the following authorities, will be as follows:—

Mr. HULL.									
Million Tons.	Less that Extracted.		Left.		For Waste Deduct $\frac{1}{4}$		Million Tons Available.		
12,500	.. 1,000	..	11,500	..	2,875	..	8,625		
Mr. HUGH TAYLOR.									
10,370 $\frac{1}{2}$	.. 1,000	..	9,370 $\frac{1}{2}$	..	2,342 $\frac{1}{2}$	..	7,028 (c)		
Mr. T. Y. HALL.									
8,132 $\frac{1}{2}$	.. 1,000	..	7,132 $\frac{1}{2}$	..	1,783 $\frac{1}{2}$	..	5,349		

The duration of our coal, based on the estimates, will depend on the increase of consumption which, for the period from 1846 to 1862, or 16 years, has risen from ten to twenty-two millions of tons annually.

Cheap and abundant coal is the parent in Britain of cheapness in iron, in machinery, in transport by sea and land, in cotton, and in every kind of manufacture. Can it be

(c) Mr. Taylor, in 1829, considered only 6046 million tons remained for future consumption, from which, deducting the consumption since, viz., 357 millions, with 120 for waste, reduces the available weight, at the end of 1862, to 5569 millions of tons.

doubted that our importance, socially and politically, is due to our coal-fields? Let a stranger cross our country from north to south, from east to west, and the origin of our commercial activity will stand revealed before him; and that the greatness of this nation will vanish with the exhaustion of her coal he will acknowledge as a natural consequence. Is it true then that we husband these inestimable resources with the care their value demands? Legislation to check supply, as was formerly done with wood for fuel in this country, and is still practised in Sweden, is clearly impracticable and unwise; but do we use the coal we abstract from our country's powers to run the race with the swift, or wage war against the strong, with the prudence its priceless worth requires? It is useless now to raise lamentation over those days when, to suit particular markets, hundreds of thousands of tons of coal were wastefully consumed at the pit's mouth. That is past; let us look to ourselves and to the future.

Practically, the operation in any ordinary furnace is to secure the necessary temperature to the substance under treatment, and allow just as much heat to escape as will, from rarefaction of the resulting gases, create a power to establish a rapid current, or draught, up the chimney. In many cases, however—for example, in all reverberatory furnaces—the temperature required for heating the matter on the bed of the furnace, is such that only the first effects of the fuel can be applied to the operation. The result of this is, there is an undue escape of heat to the chimney, productive of no good effect whatever, but the reverse; for Peclet has shown, that when the contents of a chimney are heated above 572 degrees F., there is a positive retardation in the draught, and between 482° and 572° the current is about the same. It is unnecessary for our purpose to import into the subject any refined theoretical considerations connected with heat; the proofs are simple and easily understood. In rolling mills 10 to 13 cwts. of coal are employed for heating the iron; the volumes of flame at the head of each chimney proclaim the loss of fuel. Four to five

cwts. of coal are required to raise steam for the high-pressure steam-engines used in driving the mills. In puddling, 20 to 23 cwts. are used in the furnace, and about 4 cwts. for engines. Until recently, and still in the great majority of cases, coal is specially burnt to obtain that steam which practice now proves the waste heat from the iron furnaces themselves can easily supply. It is within the mark when it is stated that one million of tons of coal are annually wasted in Great Britain in this way alone.

In round numbers, the coke from $3\frac{1}{2}$ tons of coal is used to produce a ton of pig iron, and three-quarters of a ton of coal is required to raise steam for the blowing engines, and heat the blast. Practice has proved, perhaps at the risk of some inconvenience and difficulty, that this three-quarters of a ton can be entirely saved by using the gases formerly allowed to escape from the blast furnaces, entailing a loss of close on 3,000,000 of tons of fuel annually, or about 20 per cent. of that used in smelting.

In the Newcastle and Durham Coal-field above 2,500,000 tons of coke annually are manufactured, to produce which more than 4,250,000 tons of coal are used. Inflammable gas and solid coke, weighing 1,750,000 tons per annum, in this district alone find their way, with their attendant heat, into the atmosphere. 500,000 tons of this are probably required to maintain the necessary temperature of the coke ovens, leaving a clear loss of 1,250,000 tons of fuel out of 4,250,000, or close on 30 per cent., and probably more than enough to keep steam-engines of 20,000 horse-power going night and day. Without taking any extraordinary care to economise the heat thus escaping, it has been shown, on a large scale, that 2,500,000 tons of coke, in its manufacture, can evaporate above 3,000,000 tons of water.

Peclet estimates that all boiler fires permit one-fourth of the heat to escape by the chimney. Our household fires have much to account for, as in them, it is calculated, 19,000,000 tons of coal is annually consumed; and looking at the faulty construction of our national firesides, they waste probably one-third. Supposing the average loss from

all sources to be 25 per cent., we shall have to answer to posterity for something like 20,000,000 tons of coal out of the 83,635,214 tons raised last year in Great Britain, according to Mr. Robert Hunt's estimate in the Government Statistical Returns.

Recently, in chemical works and in other manufacturing operations, as well as in steam-engine boilers, various plans have been put into practice to avoid a loss which is truly one of great national importance.

The question of exhaustion of our coal-field will, to some extent, be regulated by the cost at which the extraction of the coal itself can be effected, as compared to that of other districts in our own country as well as of those abroad. No doubt long before the whole of that lying under the counties of Northumberland and Durham has been consumed, its increased cost of raising will prove a practical limit to further use. Nothing is more common, when this theme is under discussion, than the assertion that long before our mines cease being productive some substitute for coal will have been discovered. If the mind can reach that period, it may well be doubted whether Providence will ever leave the human race entirely destitute of that which is so essential to its welfare as coal, but the exhaustion of this mineral in one particular country, even so immensely favoured as Britain, is a question which might be solved to our disadvantage without infringing on those natural laws upon which the happiness of mankind as a whole is dependent.

Electricity is the favourite successor of our coal. It is perhaps presumptuous to foretell to what extent this agent can be applied. Heat of great intensity has been excited, chemical combinations dissolved, and motive power produced by its aid; but it is not too much to say that in all these results there does not *at present* appear the faintest justification for wasting one single pound of coal in the hope that electricity can take the place of our mineral fuel, which, in many cases in its combustion, supplies not only elevated temperature, but also chemical actions, as essential to the operation in hand as the heat itself. The very agents used in exciting electri-

city are the results of the combustion of many tons of coal, and to calculate on using a metal such as zinc to reproduce itself and have power to spare, is a contradiction of terms which may be regarded as impossible, and were it not so, as long as the 60,000 square miles of coal-field in Pennsylvania and other enormous districts remain to furnish mineral fuel, competition from any other source is simply hopeless.

Coke.—Coal is of two qualities, caking and open burning. When the latter is entirely free from caking property, and is exposed to heat, each fragment of coal preserves its shape during the expulsion of the volatile portion. Caking coal, on the other hand, fuses so that all vestige of the original form is lost, and coal, originally small, forms large masses of coke. The generality of the Newcastle coal possesses this agglomerating property, which renders it highly valuable for coking. Coke is largely employed in iron smelting and in locomotives, where our caking coal would be inadmissible. To give an idea of the extent of the consumption by railways, it may be mentioned that the North-Eastern Company burnt in their engines last year 183,431½ tons. The quantity of coke produced in the Northern Coal-field is about 2,625,000 tons annually. Its manufacture is very simple. The coal is merely thrown into a vaulted oven, where the heat remaining from the previous charge fires that recently loaded. Five tons of coal produce nearly three of coke, worth 7*s.* 6*d.* to 10*s.* a ton at the ovens. Besides the enormous loss of heat already alluded to, a vast quantity of valuable tar, ammonia and other products are dissipated. These and the smoke, in too many cases, are permitted to escape into the atmosphere from the low ovens, blackening the country for miles, and destroying vegetation. All these polluting influences can be avoided by a proper and very simple arrangement of flues and chimneys. It is to be hoped that, in the present bill under the consideration of Parliament, a frightful nuisance, so easily capable of abatement, will be dealt with.

Lamp Black.—Coal, coked with an imperfect admission of air, gives off immense volumes of dense smoke. This

smoke is received into brick chambers, where it is condensed and forms the lamp black of commerce. Of it about 1,500 tons a year are produced, worth about £15 a ton.

Asphalte and other products distilled from Coal.—In 1781, Lord Dundonald, the same who laboured with Mr. Wm. Losh in establishing soda works, patented “the making of tar, pitch, essential oils, volatile alkali, mineral acids, salts, and cinders from pit coal.” His lordship, it is supposed, was not the first who had laboured in this field, a Mr. Dixon having established works for extracting tar from coal. Both manufactories were abandoned, and when, many years after, the distillation of illuminating gas from coal, gave coal tar as a residual product, it was considered so worthless as to be burnt under the retorts for fuel, and thus rid the gas works of the nuisance. Various circumstances have led to a reversal of this order of things. A natural pitch, or bitumen, was discovered in certain localities, and this when heated and mixed with sand and gravel, was found to form excellent roads and footpaths. This application has been followed by substituting pitch, got by exposing coal tar to a process of distillation, by which certain volatile oils are expelled as vapour, and condensed, the bitumen remaining behind. The Tyne Asphalte Company have laid down nearly five square miles of asphalting during the past year, for which 750 tons of bitumen were used, besides 5,000 gallons of coal oil.

Patent Fuel.—When on the subject of bitumen, allusion may be made to the establishing of a large work at Gateshead, for the manufacture of the so-called patent fuel, which was obtained by mixing small coal of inferior value with powdered pitch, heating and compressing the mixture into blocks. Very perfect machinery and apparatus were put up at great cost, and effected the object in a very economical way. But the fuel so made was found unable to compete with large coals, and the project has been gradually abandoned. The process is still pursued in some localities, but, according to Mr. Gordon of the fuel works here, with very doubtful success.

Crude Naphtha.—When the ordinary coal tar is distilled in close vessels a volatile substance bearing the above mentioned name comes over first, and from it are produced the beautiful aniline colours mauve and magenta, of recent introduction. This crude naphtha is followed by a second product, called

Light Oil, which, on redistillation, gives a fresh quantity of naphtha and an oil used for illuminating purposes. The last substance which distils over is

Heavy Oil, or Greasote, now so largely used in preserving railway sleepers and timber from decay.

From some of these results of distillation essences of delicate odour and flavour are prepared, resembling those of different fruits, and are, in consequence, used for flavouring confectionery.

The conversion of so unpromising-looking a substance as coal tar into such a variety of purposes is somewhat striking. By means of it we pave our roads, preserve the foundations of our railways, illuminate our houses, produce the most exquisite colours, and make it even enter into our food.

Gas Making.—Sir Humphrey Davy, it is said, ridiculed the idea of illuminating a town, or even a single building, with coal gas. The 500,000 tons of coal or more, annually consumed in the London gasworks, prove our philosopher was wrong. Newcastle, of course, has its gasworks, which, being recently re-constructed, embrace all the recent improvements of the day. Nearly 500 retorts give off, in winter, daily 1,800,000 cubic feet of gas, requiring near 200 tons of coal, and this immense volume, and more, can be stored in the enormous gas-holders of the company.

On the same premises, where the coal is distilled, the gas passes the condensing and washing vessels, which separate both the ammoniacal liquor, from which sulphate of ammonia is prepared, and the tar, which latter is distilled in the way previously described. The gas itself passes through purifiers filled with oxide of iron, by which means the sulphur is absorbed.

Smoke.—We have seen how immensely this district has

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profited by the bountiful abundance of its coal. Many millions of tons, exported from it, add to the comfort of thousands of homes, convert night into day, and maintain in action every phase of manufacturing industry. At home its cheapness has attracted to our neighbourhood numerous establishments, which have placed us in the front of commercial enterprise. We have also seen that neither in its mining nor in its consumption have we been guided by those considerations of economy, which its value demands at our hands. It will not be difficult to show that, as a rule, we are equally regardless of the consequences attending its use. No one entering Newcastle or the neighbourhood can do otherwise than bewail the condition of those who are doomed to live under that canopy of smoke which the imperfect consumption of coal in our furnaces spreads over the inhabitants. It may be difficult, in some particular instances, to avoid this entirely; but that it can be reduced to a point which would immensely diminish the nuisance is undoubted. In confirmation of this, London, as well as other places, can be quoted as instances of what can be effected, and, indeed, as far as Newcastle itself is concerned, there is no question, of late years considerable improvement is visible by the application of the provisions of a recent Act of Parliament. No restrictions, however, being imposed on the adjacent neighbourhood, Newcastle itself still stands as a synonyme for smoke and soot.

The usual condition attached to any apparatus proposed for the suppression of smoke is its independence of all attention on the part of the firemen. In many cases the owners of furnaces, particularly those of steam boilers, are more to blame than their workmen. A little consideration of the circumstances which require observance in a furnace, renders it highly improbable that any plan can ever be devised in which the formation of smoke will be reduced to the impossible. In all furnaces, the fuel is not less indispensable than the air necessary for its combustion. Increase the former more rapidly than the latter can be introduced, and smoke is as inevitable as in turning on gas in an argand

burner too high, or in elevating the wick of an oil lamp too much; and from precisely the same cause. Now, in nine times out of ten, the master asks his man to get more than one boiler's work out of the boiler, or in other words, to burn more fuel than the furnace can admit air for its complete combustion, and then blames the engineer or the fireman for doing that which it is impossible to avoid. Under the most favourable circumstances, particularly with our small coal, it is not an easy matter entirely to avoid smoke. The fuel is thrown into a hot furnace on glowing coke, where, from the amount of surface exposed to the heat, the gas of our highly bituminous coal is emitted with immense rapidity. The quantity of gaseous matter the furnace can allow passage for is limited. The inflammable gas distilled from the coal has the advantage, from the usual construction of the furnace, of the first of the draught, and in consequence, the quantity of air admitted, is not that which the gas requires for its combustion, but that which the chimney can carry away over and above the rapidly emitted smoke-producing gas. No pains being taken to regulate the relative quantities of each, smoke only ceases after the recently charged coal has parted with so much of its volatile portion, that its further emission is not above that which the increasing influx of air is capable of mastering.

A simple mode of equalizing the rapidity of combustion, and of supplying the necessary air for its products, has been practised in the boiler furnaces at Washington for some years. The temperature of that portion of the furnace on which the fresh coal is thrown has its temperature reduced, in order that the gas may be given off more regularly than is the case when it is placed on highly incandescent fuel. To attain this, the apertures between the bars at the front of the furnace, where the fresh fuel is usually supplied, are smaller than those at the other end of the furnace. The flame, instead of moving from the door, is reversed, by the back of the furnace being built up close to the boiler, and, in consequence, the flame escapes from the fire-place through an aperture immediately above the fire-door, and then is conduc-

ted round the boiler in the ordinary way. By this method the gases are distilled from the coal gradually, and almost exclusively from the top of the charge, by the flame and hot products of combustion from the back of the furnace playing on the surface of the fresh coal. A more perfect admixture of air with the coal gas is also secured by the former being admitted through apertures in the doors, and meeting instead of following the other gaseous element in the furnace. The coal, after remaining a proper time, is pushed to the back of the furnace, as is usually done in ordinary furnaces, and a fresh charge is introduced.

METALLURGY.

Iron.—The coal formation of geologists is composed, as is well known, of a series of rocks, of which coal itself forms only a very small proportion, the remainder being made up of sandstone, shales, &c. Disseminated among the shales there is generally to be found bands or nodules of ironstone, and these in many districts, as in South Wales, Staffordshire, Scotland, &c., occur in sufficient abundance to have given rise to the establishment of iron works on an immense scale. It is remarkable, however, that a mineral field so enormously rich in one respect, viz., in coal, as that of Northumberland and Durham is, should stand so low, when compared with others, so far as ironstone is concerned. This mineral is never entirely absent from our coal measures; on the contrary, it does exist in sufficient quantity to have led, in former years, to its extraction as an ore of iron.

In the time of the Romans, when iron was only required in small quantities, and the forests, everywhere, furnished the necessary fuel, small hearths or bloomeries for the production of malleable iron were erected, as is manifest from the heaps of scorix found near many of the Roman stations, and described by Hodgson and Wallis in their Histories of Northumberland. When this mode of treating ores of iron was superseded by that in present use, viz., obtaining pig or cast iron, by means of a high blast furnace, works in the valley of

the North Tyne, near Lee Hall, and at Bedlington, were established, in which charcoal was the fuel used. Exhaustion of timber, from this and other causes, led to both of these concerns being abandoned about a century ago. Previous to this, pit coal had been proposed as a substitute for charcoal in iron furnaces, but not until after the lapse of a century was its application successfully pursued. Encouraged by the favourable results elsewhere, Mr. Cookson, an ancestor of the present family of that name, who had recently purchased the property at Whitehill, near Chester-le-Street, in 1745, erected a blast furnace on that estate, to smelt iron by means of fossil coal. He was induced to do so, from having observed ironstone in the Chester-burn, the waters of which had to move the necessary blowing apparatus, for in those days steam engines were unknown. The furnace was 35 feet high, and produced 25 tons per week. At it, according to information obtained through the assistance of Mr. Joseph Cookson, castings for the collieries, and ultimately, ordnance for government, were made. The supply of stone must have proved insufficient, for it existed in a band less than 5 inches in thickness; at all events, Mr. Cookson states that a portion of ore was picked up in Robin Hood's Bay, and conveyed to the Wear by sea, and thence carted from Picktree to the works. This establishment continued working to the close of the last century, when a failing supply of water led to its being extinguished, and finally abandoned. In the beginning of the present century, pig iron was worth about £8 per ton, and its demand augmenting largely with the increase of our coal mines, the Tyne Iron Company established their works at Lemington, the recent introduction of the steam engine rendering them independent of water-power. Their furnaces were chiefly supplied by the small bands of ironstone found in the coal pits. The cost of this mineral varied from 10s. to 20s. a ton, the average being about 16s. per ton. In addition to this, their ironstone was gathered in considerable quantities on the Yorkshire coast—the produce of that field which hereafter had to effect so great a change

in this branch of industry in the north. By the kindness of Mr. G. Clayton Atkinson, I am able to give the result of their workings in the year 1812, when a furnace made 2547 tons, or 49 tons per week. There was used for each ton of iron—

			s.	d.	£	s.	d.	£	s.	d.
Ironstone	..	3'44 tons	..	16	1	..	2	15	5	
Hematite Ore	..	'11 „	..	31	6	..	0	3	5	
									2	18 10
Flux Chalk	..	1'38 „	..	2	0				0	2 9
Coke	..	2'40 „	..	12	5				1	9 9
Labour, &c., &c.	..	..	..	..	..				0	14 2
									£5	5 6

Birtley, in 1830, and the Wylam furnaces, in 1836, were established in the hope of obtaining the necessary supplies of ironstone in their immediate neighbourhood. The introduction of the hot blast, about 1828, and the immense production consequent upon it, and upon the discovery of the black band, so completely altered the character of the iron trade that these works must, under the then existing circumstances, speedily have been dismantled. Pig iron, under the influence of the events just mentioned, in 1840, was selling at £3 12s. 6d. per ton at Glasgow, and it has since that time been as low as £2.

Fortunately, however, for the neighbourhood, those geological advantages, to which allusion has already been made, have placed within our reach means of making good that deficiency which this coal-field labours under. Some thirty years ago, Mr. Wilson, one of the owners of the Lemington iron works, at Newcastle, was in the neighbourhood of Whitby, and observed a mineral which arrested his attention. Further examination proved that this was ironstone, and as the seam or band which produced it was of sufficient thickness, arrangements were made for working it. The Whitby ironstone is poor, containing 25 or 26 per cent. of metal, and the expense of carrying it to Newcastle considerable; nevertheless, its comparative abundance, occurring, as it does, in a seam four feet thick, enabled the owners to work and send away many

thousands of tons annually. The existence of the same beds, notwithstanding the knowledge of the continuation of the accompanying measures, was not sought for further north for some years, and, in the meantime, Messrs. Bolckow and Vaughan, who had erected rolling mills at Middlesbro', built blast furnaces at Witton Park to smelt ironstone, which they expected to obtain in the vicinity of the works; a mode of supply which had to be abandoned, and Whitby resorted to, as had been previously done on the Tyne. They continued for some time to import ironstone into the Tees, and landed it at their works at Middlesbro', within three miles of the most productive deposit of this mineral ever discovered in this country. The position of this bed, practically, was first recognised at Skinningrove, and worked a short time by Messrs. Bolckow and Vaughan, who then continued their researches; and to Mr. Vaughan is, no doubt, due the merit of having led the way in its development, which, in ten years, has placed Middlesbro' among the leading iron districts in the world. Not only is the bed of ironstone accessible to an extent which suffices for present demands by day levels, from the sides of the hills in which it is found, but it is much more abundant than at Whitby, seldom less than 8 feet in thickness, and often reaching 12 or 14, and even as high as 18 feet. In richness of metal it also exceeds the produce of that worked further south, containing nearly one-fourth more iron, *i.e.*, 30 to 32 instead of 25 and 26 per cent. A large deposit of ironstone occurs at Rosedale Abbey, where a seam thickens out over a limited space to 60 or 80 feet, and, instead of containing the iron as carbonate, does so chiefly as magnetic oxide. For those who wish for information on the Cleveland ironstone, beyond that imposed by the limits of such a work as the present, a book by Mr. Joseph Bewick, and an excellent paper by Mr. John Marley, of Darlington, in the Transactions of the Northern Mining Engineers, may be consulted with advantage.

On the western edge of our coal-field, near Shotley Bridge—and where, in former days, a German colony had established

itself, made iron and manufactured swords from their produce—are certain beds of ironstone. They are not unlike those already spoken of near Lemington, Birtley, &c.; but six or seven occurring within a space of seven feet, 12 to 15 inches of ore was thus obtained, according to the late Mr. William Cargill. Another working under it gave six or seven inches in three feet (*c*). Besides this, at no great distance, is limestone in great abundance, while the ironstone field itself yields coal of excellent quality for iron making, and of easy and economical extraction. These advantages led a company of gentlemen to establish a very large work near Shotley Bridge, comprising 14 blast furnaces and immense rolling mills. There is little doubt the resources of that district in ironstone would have been speedily exhausted under the demand such a concern entailed; but before this occurred, the same ironstone which had superseded the local produce of the Tyne took the place of that found at Shotley Bridge, and at the present day all the ironstone pits of that neighbourhood are idle.

Ten or a dozen years only have elapsed since the so-called Cleveland ironstone was first introduced to public notice; nevertheless, at the present time from 1,500,000 to 2,000,000 tons of it are obtained annually from the mines of that district. Previous to its discovery there were 32 furnaces in the north, exclusive of those on the mountain limestone in Northumberland, all of which, with the exception of half a dozen, are working on Cleveland stone; and, in addition, 73 more have been built, and further extensions projected.

Attempts have likewise been made to produce pig iron from the minerals lying lower down in the series, viz., from those of the mountain limestone, where coal and ironstone are to be met with in considerable quantities. At Ridsdale and Bellingham, and, later, at Brinkburn on the Coquet, works were established for this purpose. The quality of the produce was highly esteemed, but in consequence of the

(*c*) Mr. Edw. F. Boyd, in a compendious report, speaks of eight inches occurring in the former, "the ten band," in five inches of shale, and four and a half inches in three and a half feet of shale in the second seam.

cost of mining the necessary supplies, and the distance from a market, after a very large expenditure of capital, the whole were laid in, and have since been dismantled.

The mineral veins of the mountain limestone in the western portion of Durham contain a large quantity of spathose iron ore (crystallized carbonate of iron), and hydrated peroxide, the result of the action of the atmosphere on the former. Messrs. Baring and Attwood erected furnaces at Towlaw where this is smelted, and iron of a very excellent quality, resembling the German "spiegel eisen" is produced. This is partly sold as such, and partly converted into malleable iron at the recently constructed mills, situate at Tudhoe, near Ferry Hill.

As a mixture with the Cleveland stone, a good deal of hematite ore from Ulverstone and Whitehaven, together with some black band from Fifeshire, are brought to the neighbourhood—and a small district of the latter found on the estate of Sir Edward Blackett, was worked near Haydon Bridge, and smelted so long as it could be profitably supplied to the furnaces.

At Haltwhistle a work was built to smelt ore, a hydrated oxide, found at Alston, and ironstone obtained close at hand, but after a few months the furnace was abandoned.

The present position of the manufacture of malleable iron forms a striking contrast with its importance at the beginning of the century, when the only branch carried on was importing Swedish and other kinds of bar iron, and converting it into nail rods. Subsequently small rolling mills for working up the old iron of the collieries, &c., were established at Lemington by the Tyne Iron Company, and at Gateshead by Messrs. Hawks & Company. These were followed, about 1827, by larger works at Walker, erected by Messrs. Losh, Wilson, and Bell, and where, for the first time in the neighbourhood, iron was puddled, and bar iron produced from the original pig. The rapid extension of the manufacture of pig iron in Scotland, consequent on the introduction of the hot blast, gave increased facilities for the development of rolling mills on our coal-field, and this to an extent not only equal to supply the local

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demand, but to export considerable quantities of malleable iron. Within the last 10 years these advantages have been greatly added to by the immense production of pig iron in the Middlesbro' district. At the present moment in bars, rails, boiler plate, iron for the numerous iron ship building yards, &c., there cannot be less than 250,000 to 300,000 tons yearly turned out, to effect which all the latest improvements in power of machinery and arrangements generally have been applied.

The smelting process, as followed in this district, presents nothing differing in character from that pursued elsewhere. The ore or ironstone, as it is called, is first calcined in kilns, resembling those in which lime is burnt—this expels water, carbonic acid, and sulphur. The stone or mine, as it is then termed, is, along with limestone and coke, poured into the top of a blast furnace, 40 to 50 feet, or more, in height, which may be described as two truncated cones placed base to base. Air at a high pressure, three to four pounds on the square inch, and heated by passing through hot iron pipes, is admitted below at the rate of about 4,000 cubic feet per minute. An intense heat of dazzling whiteness is the result—the oxide of iron is reduced—the earths associated with the ore and with the fuel unite with the lime of the limestone, while the iron, combining with three to four per cent of carbon of the coke, falls into the hearth with a little impurity, and constitutes cast iron. The earths, fused into a slag, float on the top of the metal, and when the hearth is about full of the latter, which happens every twelve hours, the iron is run out into what are known as pigs. The present make of the northern district is near 600,000 to 700,000 tons yearly, to produce which will be required about 2,000,000 tons of ironstone, chiefly Cleveland, about 2,250,000 tons of coal, and 500,000 tons of limestone, and, what few ever give heed to, something near 8,000,000 tons of air driven into the various furnaces, with a united power of not far short of 3,000 horses. The manufacture of pig iron gives employment to a large number of workmen, the amount of wages paid being not far short of a million sterling annually, without

taking into account that paid to the railways employed in conveying minerals, &c., but simply for mining and smelting the materials.

In the rolling mills the pig iron is melted in a reverberatory furnace, which burns off the carbon and other impurities, and as this happens, the iron is converted gradually into pieces the size of small gravel. This is welded by the manual labour of the puddler, and then brought out to the hammers or squeezers, by which the separate pieces are firmly united into a "bloom." The bloom is passed through rollers, and the bars so produced are, afterwards, cut into lengths, re-heated, and the rolling process again submitted to, constituting the bar iron of commerce.

Steel.—Nature appears to have lavished her gifts with bountiful profusion on iron. We have the metal itself, the strongest form of simple matter we know of—its ores the most abundant, and their treatment among the most simple of any. Without its almost singular power of welding, neither its ductility nor malleability would be of much avail. To enumerate the catalogue of uses to which a substance having the properties just spoken of can be applied, is superfluous; the most important are familiar to every eye. Valuable as iron is in that form known as wrought iron, its worth is immensely enhanced by the power it possesses of combining with carbon in certain proportions, and while it parts with certain excellent qualities it is in the purer state endowed with, it merely exchanges them for others of a not less remarkable and valuable character. With 4 or 5 per cent. of carbon we have cast iron—neither malleable, ductile, nor capable of being welded—but, unlike malleable iron, fusible, at a moderate temperature; and, from the curious property it has of expanding at the moment of consolidation, receiving the finest impress of any mould into which it is run. A less proportion of carbon united with our metal gives us steel—a substance having an immense range of valuable characteristics—uniting as it were, along with others, both those which render cast and wrought iron of such value in the arts. It is ductile and malleable to a degree exceeding that of iron,

which it surpasses in strength. It can be welded as well as melted and run into moulds. By the simple treatment of rapid or slow cooling, it acquires a great range of hardness, affording files and other tools, before which all other metals give way.

To produce steel of the finest quality the purest iron only is employed, that from Russia and Sweden being the best, where the ores are pure and the fuel used in smelting is charcoal. With cheap coal and a seaport one would have expected Newcastle to have been an excellent locality for the manufacture of steel. One of those anomalies of trade has ordered it otherwise, and Sheffield, with less advantages, is the great seat of this branch of our national industry. Newcastle and its environs, however, have been associated with the production of steel for many generations. So far back as 300 years ago the German colonists at Shotley Bridge were engaged in making steel. To Mr. Thomas Spencer, of the Newburn Steel Works, the writer is indebted for the following particulars:—There is annually produced, on the Tyne, 3000 tons of steel, of the value of £100,000, employing in its manufacture about 300 persons. The works are chiefly old-established concerns, and, in consequence, placed where water power is available. By far the most considerable are those of Messrs. John Spencer and Sons, at Newburn, where there are six converting and thirty-six melting furnaces. Bars of iron are laid on charcoal, and exposed for some days to a high temperature in the converting furnaces. At the end of the operation, they are brought out, covered with swellings or blisters, and constituting what is termed blister steel. These bars are welded and hammered, or rolled out, at Newburn, for various purposes to which steel of such quality is applicable, or they are fused and run into ingots of cast steel, which is also hammered or rolled as required. Two hundred men are engaged at Newburn in the conversion of iron into steel, and its subsequent manufacture into railway and other springs, axles, railway tyres for wheels, piston rods, files, &c., &c.

A few years ago, Mr. Bessemer proposed to manufacture

steel direct from cast iron by melting the pig, and in that state blowing air through it, so as to burn just so much of the carbon as constitutes the difference between cast iron and steel. Some trials have been made in the neighbourhood; but although this more direct process is practised on a large scale elsewhere, it is not as yet pursued here. Mr. Bessemer proposes also to carry his operation still further, and thus obtain malleable iron. This method has also been tried, but abandoned after a preliminary trial at Walker.

Lead and Silver.—Of the entire quantity of lead raised in the United Kingdom, which is about 66,000 tons yearly, a very considerable portion is found in the mountain limestone and its associated strata. These measures rise to the surface and form the elevated ground in the neighbourhood of Alston Moor and Weardale—districts which, from time immemorial, have been extensively worked for this useful metal, and at present yield about 20,000 tons of lead per annum. The strata contain what probably at one period have been extensive rents or fissures, now filled up with various mineral matter—carbonate of lime, carbonate and sulphate of barytes, carbonate and oxide and sulphuret of iron, sulphuret of zinc, and here and there, in greater or less abundance, sulphuret of lead or galena—that particular combination of lead which exclusively constitutes its source in those mines. The “vein stuff” or matrix is crushed between powerful iron rollers and washed, by which process, by virtue of their lesser specific gravity, foreign substances are separated, and the galena left tolerably pure. The mines themselves, as a rule, owing to the conformation of the country, are simply levels or adits, running in at the side of the hills, thus affording not only means of bringing the produce of the mine to day, but also of freeing the works of water. The levels either run in the vein itself or pass through the rock traversed by the vein, and join it as directly as possible. Nothing in mining is more uncertain than the productiveness of a lead vein. Years are frequently spent in next to fruitless labour, in some instances entirely so, the miner toiling on in the hope that his adventure may prove one of those



prizes which occasionally turn up, and the change from barrenness to great wealth is sometimes astonishingly sudden. In the case of Hudgill Burn mine—one day the prospects were as gloomy as the mind could imagine, and in a week or two subsequent, large masses of ore were reached, and which lasted for many years, conferring wealth on all its proprietary; lead ore, which was reported to have cost only a few shillings per bing (8 cwts.), selling for £4 to £5. As some time elapses before the produce of the mine is washed up, and, consequently, before the miners can be paid, subsistence or lent money, about 10s. per week, is advanced, and the balance, if any, paid at the end of the year. Occasionally, the mine turns out so unproductive as to leave the miner in debt, even after only receiving so small a sum as 10s. per week. On the other hand, men have made as much as £300 in one year. The subsistence is small, but as a rule, the miners have small plots of ground, which assist in their maintenance until the settling day comes. The usual plan is for the miner to share in the risk of the mine. Bargains, as they are termed, are let for a quarter of a year, at so much per bing (8 cwts.) of washed ore, the price varying with the appearance of the vein. If the yield of ore falls off, the miner has a bad take; but if, on the other hand, its condition suddenly improves, his contract is a beneficial one for the remainder of his term. In many places, much of the ore has been reached in the veins now known, as the water permits, and in the hope of assisting the produce of the miner, a very costly water level, three miles in length, was driven, under the direction of Smeaton, the celebrated engineer, from Nent Force up Nent Valley, partly in the hope of discovering fresh veins, and partly to drain fresh ground for future operations. No commensurate return ever resulted from the great outlay involved in its construction. A similar undertaking is now in hands for freeing the mines of Wentworth B. Beaumont, Esq., M.P. It consists of a long level, with shafts, out of which the water is raised by hydraulic engines, contrived and erected by Sir William Armstrong; the motive power being

supplied by water wheels forcing the water up a great height, and which in its descent communicates the required power to the hydraulic machinery. The chief portion of the minerals in the Alston Moor district is the property of the Commissioners of Greenwich Hospital, formerly the estate of the unfortunate Earl of Derwentwater. Leases are granted, and the royalty consists in 1-7th to 1-10th of the produce of the mine. The receiver attends to see that the ore the Hospital obtains as their rent is a fair average of the whole, and periodically this is sampled for purchasers and sold to the highest bidder, the price varying with the price of lead, its richness in metal, and, as we shall hereafter see, its produce of silver. Usually 70 to 75 per cent. is the yield of lead. Few miners smelt their own ore, indeed the uncertainty of lead mining is such, that unless the mine proprietor has the command of several veins, his works might frequently be idle for want of material. Mr. Beaumont and the London Lead Company are the principal exceptions to this rule, both being the lessees of several mines. Mr. Beaumont, it is said, in some years raised ore enough to furnish 10,000 tons of metal.

The ores of lead thus obtained are made to yield their metal by a very simple process—heat, in a reverberatory furnace sufficing, or occasionally, according to the nature of the ore, in a small fire urged by a blast of air called a hearth. A considerable portion of the oxide and sulphate of lead, which are formed during the operation of smelting, being of a very volatile character, escape from the furnaces as a vapour; and formerly, this finding its way into the atmosphere, was not only a source of loss to the smelter, but also a nuisance to the neighbourhood. Now, however, very long flues or tunnels are erected at the different smelt mills of Mr. Beaumont, and in these the lead fumes are condensed to an extent which, at one cleaning out, has afforded as much as 1000 tons of lead.

In galena there generally is found associated with the lead, in greater or less quantity, the precious metal, silver. This, in the North of England, varies from the merest

trace to 30 and 40 oz. of silver to the ton of lead. Previous to 1833, the silver was extracted by placing the lead containing it in a peculiarly-constructed furnace, where it was melted, and a current of heated air passed over its fluid surface. This treatment converted the whole of the lead into an oxide, or litharge as it was termed, leaving the nobler metal behind—silver being unaltered by the operation. The litharge so obtained was then placed with coal in a reverberatory furnace, and its lead recovered by a second process of smelting. This additional treatment was not only a source of expense for labour and fuel, but was also very costly, from the great loss of lead; first, in the process of oxidation, and, second, in the reducing of the litharge so produced. The effect of all this was, that lead containing under 6 to 8 oz. of silver could not be profitably refined, as it is termed; hence all lead containing less than that quantity was so much loss of silver to the community, besides the escape of many tons of lead evaporated during the refining of such as would pay for the cost of the process. This was the state of things when the late Mr. Hugh Lee Pattinson, of Alston, who at that time filled the office of assay master to the Commissioners of Greenwich Hospital, directed his attention to the subject. Various were the first trials he made, but with no success; in vain he attempted to distil the lead, and thus leave the silver behind; equally fruitless were his endeavours to separate the two by subsidence; at length wishing to obtain lead in a granulated or powdery state, he proceeded to do that which had frequently been practised before. The lead under treatment was melted in a crucible, and during the process of cooling, stirred with an iron rod. In doing this, he noticed what had previously escaped attention, viz., particles of the metal in a semi-crystalline condition fell to the bottom, while the remainder continued fluid for some time longer. Never losing sight of the idea which had engrossed his attention for some years, the supposition that these two portions might vary in richness of silver, occurred to his mind. Assays were made, and as he supposed, a great difference in this respect was found to exist. The lead crystallizing first, left

the silver behind, squeezed out as it were from the less valuable metal, during congelation. The crystals, still containing some silver, are melted again a second and third time, and a further quantity of lead, rich in silver, obtained, and the crystals resulting from the operation contain less than an ounce to the ton. In like manner the rich lead obtained is subjected repeatedly to the crystallizing process until it contains 200 oz. of silver to the ton. The silver is not capable of complete separation by the Pattinson process, as it is now called : it still remains united with lead, and the portion thus enriched is submitted to the usual process of refining by converting the lead into litharge ; but, as lead originally only containing 10 oz. to the ton, is brought up to 200 or 300 oz. to the ton, the quantity to be so treated is not above 5 to 10 per cent. of the original weight, besides saving the lead formerly dissipated into vapour, which in the refining of 18,000 tons Mr. Pattinson considered amounted to 1,000 tons. About a similar weight of 18,000 tons of this metal can now be refined, which formerly containing under 6 ounces of silver per ton, could not be so treated, so that a considerable quantity of this latter metal is annually added to the wealth of our country by the process just described. In a paper, Mr. Pattinson read before the British Association, he calculated 54,000 ounces to be the weight of silver thus given. Besides the ores obtained in the neighbourhood of Newcastle, others from various parts of the world are brought to the Tyne for smelting, as well as about 10,000 tons of pig lead annually, in order to be refined by this process.

Lead is rolled into sheets by Messrs. Locke, Blackett, and Co., at St. Anthony's. Shot is manufactured by that firm and Messrs. Walkers, Parkers and Co. The lead, hardened with a little arsenic, is melted and run through a cullender, dropping from a considerable height into water. The shot is sorted into different sizes, all that are not perfect spheres being rejected. The shot is polished by rolling in black lead, and is then ready for the market.

Lead pipes, so much used for conveying gas and water, are also produced in large quantities by the two firms above named.

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Red lead, so largely employed in the manufacture of glass, and as a pigment, is obtained by furnacing, at a moderate temperature, the litharge previously spoken of. By this treatment additional oxygen is absorbed from the atmosphere; the produce is then ground in water, heated again, and finally ground and washed ready for use.

A well-known compound of this metal, viz., white lead, is manufactured in large quantities at Newcastle. It is a carbonate of lead, with a small excess of oxide. The metal, in thin sheets, is placed in small pots, at the bottom of which is a little vinegar or weak acetic acid; these are immersed in large numbers in beds or stacks of spent tanners' bark. Fermentation goes on, and by the joint action of the vinegar, and of carbonic acid produced by the fermentation of the bark, the lead, in about three months, is corroded and converted into hard scales of white lead. This is ground in water and dried in stoves; after which it is ground with linseed oil, and forms the white paint so well known.

A substitute for this carbonate of lead was proposed by the late Mr. H. L. Pattinson. Instead of metallic lead, he took lead ore, and added to it muriatic acid, a residual product of soda-making. By this treatment chloride of lead is formed, which is washed with cold water, to separate iron and other soluble impurities taken up by the muriatic acid. A concentrated solution is then obtained by treating the chloride of lead with boiling water. After settling, to allow undissolved impurity to subside, lime water is added in certain quantities, and there is precipitated a white substance, viz., an oxichloride of lead, which is dried and ground with oil, as is done with the carbonate. This new compound has been manufactured at the Washington Chemical Works for above ten years, and continues to be produced in considerable quantities at that establishment.

The total quantity of lead manufactured on the Tyne has been kindly furnished by Mr. James Leathart, a member of the old firm of Messrs. Locke, Blackett, & Co.

From 5500 to 6000 tons of ore are yearly smelted on the Tyne; this, of course, does not include the lead ore operated on in the mills in the country west of Newcastle.

The 10,000 tons of imported lead is of an impure character—sufficiently so to have its properties very considerably modified by the presence of antimony, iron, and other foreign bodies. It is technically known as “hard lead.” In former years, lead of this quality was exposed in a reverberatory furnace for some time, so as to oxidize those metals which acted prejudicially. Considerable difficulty was experienced in completely effecting this, owing to the rapid corrosion of the furnaces, until the late Mr. George Burnett built furnaces with bottoms of iron, which enables the manufacturers so completely to expel the impurities, that “softened lead” now is considered nearly as good as any in the market.

According to the Government Returns, the mines of Cumberland, Durham, and Northumberland, produced in 1861 :—

	LEAD (CONTAINING)		SILVER.
	Tons.	Cwts.	Oz.
	19,867	10	115,380
Add to this imported	10,000	0	470,000
Ore imported and smelted, 2500 tons yielding 50 per cent, say	1,250	0	37,500
	31,117	10	622,880

Of manufactured lead there is produced here, annually, as follows:—

	Tons.
White Lead	7,000
Red Lead	4,500 to 5000
Litharge	750
Sheet Lead	3,500 to 4,000
Pipe	1,250 to 1,500
Shot	1,000
Oxichloride	1,000 to 1,200
	19,000 to 19,700

Copper.—Copper smelting is not carried on to that extent on the Tyne to merit more than a passing notice, were there not connected with its introduction among our manufactures some circumstances deserving of mention.

Sicily, as is well known, possessed a monopoly in the sulphur trade, and as the present requirements of the British

alkali works alone would be something like 80,000 tons a-year, the importance of the relations between this country and the Neapolitan Government will be at once recognized. Unfortunately the then King of Naples was of a different way of thinking, and, about 1839, seduced by the offer of a large sum of money, conceded to a company of French speculators the exclusive right of exporting sulphur. This was followed by an enormous rise in the price of this mineral, nearly double, a change which, for a time, completely paralysed the soda trade in this country. The manufacturers were little disposed to submit to so serious an injury, and although, through the intervention of our Government, the monopoly itself was set aside, it was not before the soda makers had looked abroad for some substitute for the produce of Sicily. This they found in certain mineral veins in Cornwall and Ireland, which contain iron pyrites, a compound of iron and sulphur, and containing when pure, above 50 per cent. of sulphur. In practice, however, from the presence of impurity, 35 per cent. was about the produce. This sulphuret is combustible, the iron being oxidized or burnt, and the sulphur likewise leaving the compound as sulphurous acid, precisely as when pure sulphur undergoes combustion. As the demand for this pyrites continued other veins were discovered, so that, although the Sicilian sulphur trade is now free, the soda makers of this country, nevertheless, continue to employ the pyrites—Norway, Belgium, and Spain, now furnishing the chief supplies of excellent quality. In the mineral brought from the last named country, there exists about 2 to 3 per cent. of copper. This is not sufficient to pay the cost of raising and smelting the pyrites as an ore of copper; but when it can be made, in the first instance, to yield up its sulphur, the profitable extraction of the copper from the residue, becomes practicable. Accordingly at two manufactories on the Tyne, viz., at that of H. L. Pattinson and Co., and the Jarrow Chemical Co., something like 15 tons of copper a-week, obtained by the process usually followed in smelting ores of that metal, viz., by exposure in a reverberatory furnace, sufficiently long to permit the entire oxidation of

the accompanying iron, and vitrification of the earthy impurities, by which the copper remains of the required purity. In this way, nearly £100,000 worth of copper is annually added to our manufactured products.

In connection with pyrites, the new metal, Thallium, may be mentioned. Mr. Crookes, of London, was investigating the properties of different substances, by what is termed spectrum analysis, in which different bodies affect the prismatic spectrum in different ways. A specimen of material from which selenium had been obtained, was placed in the apparatus, and a well defined green line appeared, which Mr. Crookes ascertained to be due to a new metal he named thallium, from a Greek word signifying a green twig. So delicate is this test that 1-250 millionth of a grain can be detected in the spectroscope. Mr. C. next tried a substance which partly sublimes, and is partly carried away mechanically from the furnaces in which pyrites is calcined in the soda works, and in it he discovered from one to two per cent. of this, hitherto, very rare metal. At the Washington Chemical Works, some pounds of it has been prepared for exhibition at the meeting of the British Association.

Zinc.—In the lead mines of Alston Moor there arises tolerably frequently, a mineral known by the name of black-jack, which is a sulphuret of zinc. This (with imported ores) has led Mr. Attwood, at Hartley Burn, to establish works where about 800 tons annually of zinc are produced.

Antimony is manufactured by Messrs. Cookson & Co., to about the extent of 280 tons a year. Its chief use is for type founding.

Aluminium.—After Davy had discovered the metallic basis of the alkali, Wöhler, of Göttingen, applied himself to obtaining the metal from alumina, one of the constituents of clay. He succeeded in 1827, in obtaining a little grey powder, which he called aluminium. It was not for 30 years afterwards that St. Clair Deville succeeded in elaborating a process by which this metal has been placed in the rank of manufactures. The operation is still a costly one, but not so much so as to prevent the application of aluminium to

many useful purposes to which its peculiar properties admirably fit it. The alumina used, is obtained by heating alum, or decomposing aluminate of soda. This earth is mixed with common salt and charcoal, heated in retorts, and exposed to a current of chlorine gas. In this way a substance known to chemists as a double chloride of aluminium and sodium is obtained. Metallic sodium is procured by heating in iron vessels a mixture of soda and charcoal or coke. The sodium and the double chloride are fused together, by which the chlorine is withdrawn from the aluminium; the latter is liberated as a fusible and highly brilliant metal. Unlike silver, it is not blackened by exposure. Its lightness is remarkable, only one fourth that of silver, or exactly the weight of glass.

With copper, it forms beautiful alloys, of great strength and hardness, resembling the finest gold.

The manufacture of aluminium and its alloy of copper are carried on by Bell Brothers, at Washington, where aluminate of soda is also produced by heating the alkali with minerals containing the aluminous earth. Although admirably fitted for a mordant and other purposes, where alumina is required, the manufacture of aluminate of soda is still in its first stage of infancy.

WHAT WE DO WITH OUR IRON

Is, perhaps, as well calculated to excite surprise as the rapid growth and immense production of the district where it is made. When at full work, the 600 puddling furnaces of our forges will annually absorb above 450,000 tons of pig; and from the rolling mills thus supplied, are furnished railway bars, sufficient not only for our own neighbourhood, but enough to enable large quantities to be sent to other parts of the kingdom, as well as to our neighbours on the continent of Europe, and to distant countries in more remote quarters of the globe. Besides rails, bar-iron of every form, plates for boiler-smiths and ship-builders, huge shafts, and forgings of every design daily leave the large establishments provided for their manufacture.

Engineering Establishments.—In a locality where the first germ of railways appears to have fructified; where the locomotive, if not actually born, has been nursed into the giant we now behold it; and where steam-engines of every kind, marine as well as land, and mechanism to serve the manifold purposes of a large manufacturing and mining population are in constant requisition, we naturally expect to find the means of supplying the large demand for machinery created by such a busy scene. During the infancy of steam-engine building the few that were wanted here were brought from Birmingham; indeed, the first engine erected by Bolton and Watt in this district, still does duty at the alkali works at Walker. On the expiration of Watt's patent, engines were, of course, built in this neighbourhood, to a limited extent both in number and dimensions. When the pumping engine of 200-horse power, at Tyne Main Colliery, was set to work, its performance for long was considered one of the sights of the place. This engine was projected by George Stephenson, and constructed at Walker; and being the first of its kind, was considered a very daring experiment. It commenced pumping in 1823, and lifted 1200 gallons of water per minute. In 1823 Stephenson founded the engine works in the Forth Banks, where he built the Rocket, the victorious locomotive in the contest for the prize offered by the directors of the Liverpool and Manchester Railway. The manufacture of the locomotive has been reduced to such a matter of routine that some of our establishments—Messrs. Hawthorns for example—can turn out an engine every week. The weight of the locomotive, Mr. William Hawthorn, Jun., states, as formerly made by them, was 7 to 10 tons; now, the power required is such, that 25 and even 35 tons is the ordinary size. This firm employs as many as 1100 people when at full work. Mr. W. H. Budden gives 40 tons as the weight of the heaviest locomotive engine ever made by the firm of R. Stephenson & Co. It was capable of working up to a power represented by 1300 horses. The tender weighed 22 tons. So many as 2000 men have been employed

at one time by this firm. When railways gave signs of becoming the chief means of transit, and that at high speed, the late Mr. William Losh, foreseeing the want almost before it was felt, suggested the use of railway wheels of malleable iron, which were, and still continue to be, made in large numbers, at Walker. The growing demand for machinery brought the old firms of Messrs. Hawks & Co., Messrs. Abbot, and several others to assist in supplying the power our extended commerce called for. In recent years, the introduction of the screw propeller has led to the manufacture of a higher class of marine engines by several of the firms already spoken of, who supply these as well as the machinery which may be seen in the hundreds of river boats plying with passengers, or towing vessels in and out of the harbour. These tug-boats have been of great service in relieving ships from detention, waiting for a fair wind to carry them to sea, since the late Mr. Joseph Price, of Gateshead, suggested the use of steam power. The application of hydraulic power to cranes, and other useful purposes, first introduced Sir William Armstrong to the world as an engineer; and at Elswick, this, and various other classes of machinery, are turned out on an enormous scale; as many as 4000 men having been engaged at one time in the engine and ordnance works there. Steam hammers, iron bridges—the High Level among the number, erected by Hawks, Crawshay, and Sons, assisted by the establishments at Walker and Gateshead Park—boilers, railway wagons and trucks without end, all tend to swell the great catalogue of divers kinds of structures, which leave our workshops annually, fashioned by the busy throng of the thousands of workmen who may be seen at certain hours crowding our streets in the vicinity of the respective works.

Among these establishments, not the least interesting, as well from its extent and perfect machinery, as from being indicative of the great development of railway enterprise, are the repairing shops of the North Eastern Railway Company, at Gateshead, where the continuous labour of

1700 hands is required to maintain in working order the immense plant of a concern having nearly 1000 miles of railway under its control. Gateshead, although the chief, is only one of other similar establishments required by this great company for repairs to the engines, carriages, &c.

Iron Foundries.—Forty years since, an iron foundry on the Banks of the Tyne was by no means the common object it now is. Although, in 1800, one of the predecessors of Messrs. Hawks, Crawshay, and Sons wrote to one of his friends, that they were building a work in size “more like a church than a foundry,” a casting, two to three tons weight for Wallsend Colliery, had to be brought from Scotland after it was in operation. As a contrast to this, Mr. Morrison, of the Ouseburn Engine Works, cast for one of the steam hammers used at the Elswick Ordnance Factory, an anvil block weighing nearly 40 tons. At one of the largest works, the average weight of iron castings for 10 years following 1820 was under 1500 tons per annum, which is equal to about a fortnight’s work of some of the establishments of our own day. The average selling price during that period was above £13 a ton; one year, 1825, it reached nearly £16 10s. Articles of cast iron, which at that time, from the higher price of pig iron, and the limited demand, cost £20 per ton, can now be obtained for £5. Mr. Benjamin I. Thompson estimates the present weight turned out annually from the foundries on the Tyne to be close on 50,000 tons, and on the Tees, where large establishments devote themselves almost exclusively to the manufacture of pipes, for gas and water purposes chiefly, and railway chairs, double that weight of iron is annually consumed.

Ordnance.—Under the impulse created by the requirements of the age, the peaceful arts at the latter end of the previous century, and the first half of the present, made enormous progress. Guided by the united efforts of the Watts, Hargreaves, Cromptons, Arkwrights, Fourdriniers, Applegarths, and Stephenson’s, the steam-engine, and after it spinning, weaving, paper-making, printing, and locomotion left all previous efforts immeasurably behind. In general

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application and improvement, probably the 25 years following the peace of 1815, stand out with more marked prominence in this career of our industrial science than any other similar period. Fortunately for the human race, in Europe at least, the engines required in the art of war had been left without that encouragement which actual use and competition alone can confer, and when, in 1853, hostilities broke out, and found the troops of England and France arrayed against the power of Russia, the artillery at Alma was, in almost every respect, that of Waterloo. The Minie rifle undoubtedly was a great improvement on its predecessor, the ordinary arm of our rifle regiments, and its efficiency, and the importance of anticipating those events, which were so slowly realized, and at such cost of blood and treasure in the fatal trenches before Sebastopol, more than ever directed attention to imitating in ordnance what had been so successfully accomplished in small arms. Length of range and precision in aim, as is well known, were effected by confining behind the projectile, as far as is possible, the gaseous matter produced by the explosion of the gunpowder, and by giving to the shot itself an elongated form, and a rotation round its axis, to correct any irregularity in its own density, and preserve its point-foremost direction. These conditions are only secured by calling into action increased force, which in its turn requires increased powers of resistance in the construction of the guns themselves. In cast iron and brass these powers had already been taxed, as far as practice permitted, in dealing with the spherical loose fitting shot hitherto in use. Improvements in our methods of working wrought iron had suggested the application of the malleable metal for the construction of ordnance of large dimensions, and solid pieces of artillery had been forged and bored out afterwards. The difficulties, however, of securing a weld in iron so complete as to withstand the tremendous shock of propelling shot, particularly when the range is counted by miles instead of yards, were such that the success was of a very partial character. Things were in this state when our townsman, Sir William G. Armstrong took the matter in hand, and, without

going into the merits of his weapon as compared with others—a task for which the writer is entirely incompetent—there is, he believes, no doubt whatever that in the method of producing a strong wrought-iron tube, capable of the greatest powers of endurance, Sir William stands without a rival (*d*). Simple, and identical in principle as his process is, to some extent, with the manufacture of small twisted gun barrels, success was not attained until after immense expenditure of time and money, both in the use of proper material and machinery for its application. Instead of forging a solid gun, Sir William Armstrong takes selected square bars of malleable iron, varying in size, according to the dimensions of the gun—let us suppose one of 2 inches square. It is heated red hot, in a long furnace, at one extremity of which is a roller, which can be made to revolve by adequately powerful machinery. When the bar is hot one end of it is attached to the roller, and, on motion being given, the heated iron is drawn out by being coiled in a spiral round the barrel of the roller. The coil is then heated to the welding point and placed end up under a steam hammer, which unites the adjoining surfaces of the iron bar without any of that opening action which arises when an attempt is made to weld a solid cylinder by lateral blows. Of course, a coil so treated leaves the hammer a tube. This is carefully turned, and on the breech end a tube, similarly constructed, and previously accurately bored out, is slipped on after being heated, the contraction sufficing for retention in its place. An essential feature in Sir William's first gun is that it is loaded at the breech. This, in ships of war and fortresses, is of itself a great advantage, avoiding drawing back the piece itself. It would be difficult, without drawings, to explain the mechanism of the breech; suffice it to say, that against the back end of the tube a wedged-shaped mass of iron, drops through an aperture made in the body of the gun itself. Behind this is a large hollow screw, very ingeniously con-

(*d*) Since the above was written the Report of the Ordnance Commissioners has been issued, and from it it appears that out of 3000 guns made on Sir W. G. Armstrong's principle, which have been proved, "not one has exploded."

trived. When the wedge is out of its position, the screw and gun form a continuous tube, slightly larger in diameter at the breech end than towards the muzzle. Through the interior of the screw the shot or shell, both of a cylindrical form, and partially covered with a thin coating of lead, are introduced into the strongest part of the gun, and behind it comes the powder. The wedge is dropped into its cell, and, by means of the screw, forced up tight against the end of the gun. This appears a very simple matter, but it must be remembered how imperative it is that the tube is perfectly sealed against the escape of elastic vapour under enormous compressure, and that the screw must not budge a hair's breadth, even when warmed, and yet be so easy of manipulation as to offer no obstacle to its being worked without difficulty. The truly bored interior of the tube of the gun itself has its surface cut by a series of furrows or riflings, effected by a very ingenious kind of planing tool, which travels along it in the process of manufacture. When the shot leaves the powder-chamber its leaden surface fills up these twisted grooves of the riflings, so that the rifling of the shot and the rotation are effected at the same moment. The shells and their fuses, and above all, the mechanism for their manufacture are triumphs of engineering. Sir William has subsequently constructed a muzzle-loading gun, the same as the other as far as the method of manufacture is concerned, but in which the free admission of the shot, and its tight fit in the act of discharge, are secured by a system of rifling introduced by Sir William, and known as the shunt system. So greatly has the coil system of manufacturing ordnance been developed by Sir William, that, although the original gun submitted by him to the Government weighed only 3 cwts., the latest gun he has supplied, upon the same principle, weighs no less than 22 tons (*e*). The experiments at Shoeburyness, where a 300-pounder of this construction pierced armour plates $5\frac{1}{2}$ inches thick, and a mass of timber

(*e*) This tremendous weapon is designed to throw a projectile, of a quarter of a ton in weight, with a charge of 80 lbs. of powder. Great range in this gun is not so much sought for as great crushing effect; but there is no doubt of its competency to throw its enormous shot to a distance of 3 miles, if required.

behind, supported by a second layer of plate 2 inches thick, are fresh in every one's recollection. No target, applicable to naval construction, has yet been produced, capable of effectually resisting this piece of ordnance; and the larger weapon, since made, will necessarily produce still more decisive results.

Besides our forges, our foundries, engine shops, ordnance works, and ship yards, there are many lesser modes of consumption which, in the aggregate, absorb a great quantity of iron. The manufacture of twisted spikes for securing railway chairs to the wooden sleepers is, of itself, a large business. Mr. G. Hopper, of Houghton, devised a plan by which, as fast as his rolling mill delivers a bar of iron, it is passed to the spike making machinery, and (sometimes without further heating) is cut up and converted into the strong twisted nails used for the purpose spoken of. Nails cut out of sheets of iron, or hammered out of nail rods, hinges, shovels, and an immense variety of small ironwork, keep a busy crowd of workmen at Swalwell, Winlaton, &c., constantly at the anvil. Ambrose Crawley, in 1690, established a colony of ironworkers at the latter place, where, including miners, 1,500 persons were at one time employed by that early adventurer. Gradually, other establishments grew up around it, and while they pressed forward, Crawley's establishment declined; it however, continued in operation on a reduced scale, until a couple of years ago when it was closed.

Shipping.—The substitution of rolling mills by Henry Cort, for forge hammers, which, previous to 1783 constituted the only means of drawing out iron into its required form, placed in time, at our disposal, the power of obtaining with facility, this invaluable metal in sheets of great magnitude. Recently, armour plates, 20 tons weight, have been manufactured at the mills, constructed by Messrs. Brown, for the purpose at Sheffield. In time, it was perceived that frames of boats, as well as their external covering, might be advantageously constructed of iron, and from this the next step, a somewhat slow one, was the building of sea-going vessels. A variety of theoretical objections, in addition to those of a really

practical nature, were urged against the use of iron, and probably, in no place more persistently than in those where ships of wood had been constructed on a large scale.

The Tyne and Wear had enjoyed great renown in this branch of industry, so far as 75,000 tons register of shipping having been built in a single year on these rivers, averaging nearly 450 tons per vessel. By a return, furnished to the writer by Mr. James Laing, the eminent builder of Sunderland, in 1862, 138 wooden ships were launched at that port, of 43,629 tons, equal to 316 tons each. At Newcastle, the old shipbuilders, to a man, set their faces against iron at first; there, as was subsequently admitted by one of the most eminent, iron was allowed as only fit for small vessels. The first iron ship was built in 1838, at Liverpool, and in 1840, Mr. John Coutts, came from Aberdeen, and established himself as an iron shipbuilder at Walker. Success, as is not unfrequently the case with earlier adventurers, did not attend Mr. Coutts' enterprise; but since his time other speculators have devoted themselves to the construction of iron ships, an example, which has to some extent been followed by the builders of wooden vessels, so that gradually the iron plate is taking the place of the oak plank, and timbers of wood are giving way to ribs of metal.

At Mr. Palmer's works, at Jarrow, where two iron-clads have been furnished to our Government, the iron is smelted from the Cleveland stone, and the pig converted into plates by machinery. Thus, the entire fabric of enormous vessels, leave an establishment at one extremity, into which, at the other, the raw ore enters. There is still however, abundant room for its extension, for, as has been already stated, in 1862, at Sunderland, 138 wooden ships, equal in the aggregate to 43,629 tons, and during the same period only 22 of iron, of 13,292 tons, were launched, the latter, therefore, averaging a tonnage of 604 each. During the same year the iron vessels finished in the Tyne were equal to 21,000 tons. There is evidently room here for an extension in the enterprise of the North; we have abundance of material, excellent harbours, and cargoes to load the ships when built,

yet, with all these advantages, the Clyde has taken the lead in this application of iron in a very marked manner. In 1862, there were turned out on that river 122 vessels, of 69,969 tons, averaging, therefore, 573 tons each; and this year it is expected that 144 ships, of 123,000 tons, will be finished, being an average of 853 tons each.

From information communicated by Mr. G. Luckley, of the firm of Messrs. T. & W. Smith, and by Mr. James Laing of Sunderland, each register ton requires of timber for the hull alone, from 1 to 1.26 loads of timber of 50 feet to the load, say for a ship of 500 tons, 25,000 to 31,500 cubic feet. This is either grown on, and therefore occupying land, which might be devoted to other purposes, or is more frequently imported from abroad, at a cost of from £2500 to nearly double that sum, according to the timber used. Instead of having to export gold for this purpose, our own commercial position is greatly benefited by the substitution of iron for this imported wood. A vessel of iron, according to the testimony of the authorities already quoted, and that of an equally successful builder—Mr. Charles Mitchell—requires, per register ton, from 9 to 12 cwts. of iron; say for an average class vessel, of the tonnage specified above, 250 tons of iron, which at £10 a ton, gives £2,500 as before; but when iron is the material employed, nearly the whole goes in wages to our miners, smelters, and iron-workers. A very small expenditure of those mineral resources this district is so bountifully blest with sufficing—about 2000 tons of coal, 1200 tons of ironstone, and 300 tons of limestone would furnish the whole.

Iron vessels still require 50 to 70 loads of wood for their fittings; but the lower masts are now generally of iron, and the lower yards of steel; indeed, when wooden vessels of high burthen require their masts renewed, these materials are usually employed. According to Mr. Mitchell 3500 men are engaged, on the Tyne alone, in iron shipbuilding.

In a very comprehensive article on iron shipbuilding, which appeared in the "North British Daily Mail," is the following estimate of the weights of the materials which will

be used for the 144 vessels expected to be built this year on the Clyde :—

	Tons.
Coal	569,015
Limestone	55,648
Ironstone, calcined black band	262,272
Malleable iron, 98,800 tons; requiring 162,870 tons pig iron.	

The following will be the wages :—

To the colliers	£42,711
Limestone workers	2,000
Ironstone miners	102,271
Smelters	19,630
Malleable iron makers	165,100
Shipbuilders	676,500
Engine builders	515,000

Total wages	1,523,212
Cost of engines, exclusive of wages	350,000
Besides all wages, &c., for fittings, upholstery, &c.	

A good idea of the favour in which iron now stands, as a material for shipbuilding, may be judged of from the contents of a government return, containing a list of all the steamers of the United Kingdom at the end of 1862. The number was 2192 and of these 1298 were of iron, and the remainder 894 wood.

Rope Making.—This manufacture follows appropriately enough what has been said in shipping. Before 1840, all the ropes made in the empire were of hemp, or at least of vegetable fibre. Previously to that time, however, in the Saxon mines at Freiberg, a simply twisted rope of iron wire was used, an idea which led Mr. Newall, of Gateshead, not only to devise a much more perfect rope, but also to contrive very ingenious machinery for its production, by which twist in the wires, and in consequence, diminution of strength were avoided. At first great prejudices, as usual, prevailed against the use of such a novelty, particularly at collieries, where the miners, alarmed at its apparent slowness as compared with hemp, refused to descend the pits when ropes of wire were used. It is difficult to say to what extent wire has displaced hemp, because much of the rope which is now manufactured may be fairly put down to the general increase of trade, and a large amount to the application of

wire ropes to a new use, viz., submarine telegraph cables. Above 3000 tons per annum of hemp is spun into ropes on the Tyne and Wear, of which about two-thirds is made on the former river. This calculation is based on data given by Messrs. T. & W. Smith, Crawhall & Co., and Henry Webster, three of the principal ropemakers in the district. Of wire, the information is of a less precise character, but as far as can be ascertained, probably, not less than 4000 to 5000 tons annually of this material is converted into ropes, and of it three-fourths or more is on our own river, and the remainder at Sunderland.

Chain Cables.—The importance of a good anchor to a ship is such, that its necessity has passed into a proverb. Of not less moment is the trustworthiness of the cable which connects the ship with her anchor. This connection, fifty years ago, was invariably of hemp. The elasticity of this substance, when forming a rope, was considered to fit it admirably to break the violence of those shocks which are of such frequent occurrence when the safety of a ship and her crew depend on the durability of the cable. No doubt, the reasoning is sound enough, but when seafaring men proceeded to condemn iron cables as being rigid and devoid of elasticity, or that which practically amounted to elasticity, they fell into a serious error. They forgot that the peculiar curve assumed by chains when hung horizontally, or in a line approaching to the horizontal, contained a magazine of elasticity far exceeding that of any hempen rope ever made. This curve, the catenary, is much greater in a chain from its greater specific gravity, than in a hempen cable. A Mr. Slater, a navy surgeon, patented iron cables for naval purposes, in 1808, but the prejudice just mentioned prevented its being employed for some years. A Captain Brown, in the merchant service, was the first who ventured on its use. Chain cables were subsequently strengthened by the insertion of the cast iron stud, the invention of Mr. Brunton. About 45 years ago, Messrs. Hawks & Co., the predecessors of Messrs. Hawks, Crawshaw, and Sons, commenced the manufacture of chain

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cables on the Tyne, and their example has been extensively followed. In our day none other are used. At the present time, according to Mr. Brown, of Messrs. Abbot and Co.'s, upwards of 11,000 tons of chain of all kinds, are yearly made on the river Tyne.

Anchors.—With cheap iron and coal, and with all our ships, the demand for anchors is considerable, 2,500 tons, according to Mr. Brown, being annually manufactured here. The chief improvements have been put into operation at our anchor forges. Lieutenant Rodgers and Porter both selected the banks of the Tyne for making their patent anchors.

MANUFACTURE OF CHEMICAL PRODUCTS.

Soda.—If 1000 lbs. of wood is burnt, the well-known white ashes remain as residue, weighing from 4 to 28 lbs. If these ashes are washed with water, and the solution so obtained is boiled to dryness, a white saline matter is left, which is potass combined with acids, viz., sulphuric, muriatic, but chiefly with carbonic acid. The ashes will yield from 1 to 4 lbs. of carbonate of potass, or potashes as the alkaline substance is called. Thus, to procure 2 or 3 pounds of these potashes, 1000 pounds of wood require to be destroyed. Its properties confer upon it great value in the arts: fused with sand it produces glass; united with fats it forms soap; and in bleaching and dyeing, an alkali such as potash constitutes an indispensable ingredient. In many properties another substance, viz., soda, is closely allied to potass. An impure article was obtained by incinerating seaweed and lixiviating the ashes, which yield an alkaline mass composed of soda and potass in various states of combination. In Scotland this formed an important source of revenue, in many cases the rents of the landlord consisting mainly of the profits arising from the manufacture of kelp, as this impure soda was termed.

Attention was next directed to extracting the soda from common salt, and in the history of this branch of national industry Newcastle occupies a very conspicuous position.

The late Mr. Wm. Losh, in concert with the grandfather of the present Earl of Dundonald, commenced, in 1796, a series of attempts to decompose common salt, and obtain its alkaline base. There was, however, a serious obstacle to the profitable pursuit of the soda manufacture in this way, viz., the high duty, of about £30 a ton, imposed on salt. This difficulty was set aside by these early pioneers of the trade obtaining parliamentary sanction to evaporate a salt-spring at Walker Colliery, free of duty, for the purpose of making soda, and this led to the establishment of this, the first work of its kind in the empire, and which continues to be carried on to this day.

The first plan attempted at Walker was the decomposition of the salt by means of oxide of lead, by which a basic oxichloride of the metal and caustic soda were formed. Exposure to the heat of a reverberatory furnace gave carbonic acid to the alkali, and crystals were obtained by dissolving the soda in the usual way. Loss of metal in the process, and the unfitness of the lead compound for the pigment expected, led to its abandonment. Foiled in dealing directly with common salt, Lord Dundonald suggested its previous conversion into sulphate of soda. To effect this, copperas, or sulphate of iron, was called to their aid, and by double decomposition, sulphate of soda and chloride of iron resulted. Sulphate of soda was also procured by decomposing common salt, by means of a substance at that time known as "salenixum," which was a sulphate of potass and a residual product from the sulphuric acid makers. By double decomposition it gave, with common salt, sulphate of soda and chloride of potassium, which latter article was in request among the alum makers. The sulphate of soda from either of these processes was fluxed with coal in a furnace, and a sulphide of sodium obtained, which compound, on being mixed with sawdust, and calcined at a low heat, gave carbonate of soda, but of so impure a character that this method of manufacture was speedily laid aside. Mr. Losh afterwards decomposed common salt by means of impure potashes (carbonate of potass), which gave him carbonate of

soda and chloride of potassium. All these plans were expensive, from the costly nature of the elements used, and from the very limited extent of the operations. In an old ledger of the Walker Alkali Company, the labour alone, on a ton of crystals of soda, is stated to be £13 per ton, and the soda itself was sold at £60 per ton.

During these enquiries, the French Convention were reduced to a state of great perplexity for want of alkali. Spanish kelp, or barilla as it is named, and potashes, owing to the war, could not be imported, and all the last-named alkali in the country was required for saltpetre to make gunpowder. In 1804 they applied to their men of science for assistance in developing some improved method of obtaining soda from sea salt. Various were the plans proposed, out of which that suggested by Leblanc was adopted, and which substantially is the process still pursued. By it the salt is first converted into sulphate of soda, as was done by our Newcastle manufacturers, sulphuric acid being used instead of sulphates of iron, &c. The sulphate of soda was then heated with carbonate of lime and coal, by which treatment the sulphur united with the calcareous base, and carbonate of soda was formed. Whether from hearing something of what had been done in France, or from his own researches, is uncertain, but Mr. Losh had, as he informed the writer, endeavoured to decompose sulphate of soda by coal in a furnace, and afterwards by treating the sulphide of sodium with carbonate of lime, to produce carbonate of soda. In short, he attempted and failed to do in two furnaces that which Leblanc succeeded in doing in one. After receiving intelligence of the result of the French chemist's investigations, Mr. Losh took advantage of the peace to visit France, made himself acquainted with the details of the process, and immediately afterwards put it in operation at Walker. The furnace mass, now containing the sulphur and lime, or more correctly sulphur, lime, and the metallic base of lime called calcium, with the carbonate of soda, is treated with warm water, which dissolves out the alkali, leaving the insoluble earthy sulphide. The solution is

evaporated, and the soda furnaced to oxidize any sulphide of sodium, and carbonate any caustic alkali, and thus is produced the soda ash of commerce. By dissolving this, and again evaporating, refined alkali, or by crystallizing the solution, the well known crystals of soda are obtained.

All manufacturers of soda make their own sulphuric acid. Under the head of copper, some particulars are given respecting the raw material used in this branch of the process. In burning sulphur or pyrites the sulphur escapes as sulphurous acid. To confer upon this the additional equivalent of oxygen, nitrate of soda is used, from which nitric acid is obtained. By a series of changes in the large leaden chambers, among the vapours of sulphurous and nitrous acids, steam, and atmospheric air, too complicated to be given here, a comparatively small amount of nitrate suffices for oxidizing the sulphurous acid, and at the end of the chambers, after all the acidified sulphur is condensed, the nitrous fumes formerly escaped. In later years a method, devised by Gay Lussac, has economized this somewhat expensive ingredient, by passing the residual gases, which previously were lost, through a tower filled with coke, down which concentrated sulphuric acid is trickling. The strong acid condenses the nitrous vapours, and the solution thus obtained is made to fall through a column or tower, up which the sulphurous acid enters the chambers. This mode of treatment converts the sulphurous into sulphuric acid, and returns the nitrous vapours to the chambers to perform their original office. In this way one-half the former consumption of nitrate suffices.

In former years the expensive nitrate of potass or saltpetre was used in the sulphuric acid process, but in later times large beds of nitrate of soda, found in South America, have entirely replaced it; the advantages being about one-fourth the cost, and a greater richness in nitric acid.

Bleaching Powder.—Intimately allied with the manufacture of soda are one or two other branches of trade requiring notice. There is decomposed in the Newcastle district about 100,000 tons of salt per annum. Until recently the

muriatic acid, amounting to 61,000 tons, from this salt, would all have escaped into the atmosphere, filling, as it did then, the air with clouds of corrosive vapours, spreading destruction on vegetation wherever they fell. The nuisance grew to be intolerable, and as no gas is absorbed more readily by water than muriatic acid, plans were introduced for effecting its condensation, which is now readily done by passing it up towers filled with coke or bricks. This not only caused a cessation of the injurious effects of this acid by its escape into the atmosphere, but it placed at the disposal of the soda-maker a large quantity of a very powerful agent, susceptible of various applications. Foremost among these is its use in making bleaching powder, or hypochlorite of lime. In the days of our ancestors, our linens and cottons were bleached by exposure to the air and sun, requiring weeks or months for the oxidation or bleaching of the colouring matter. Chlorine, one of the constituents of muriatic acid, effects this almost instantly, by liberating oxygen, and the world is indebted to the late Mr. Chas. Tennant, of Glasgow, for proposing and manufacturing a compound of chlorine and lime as a convenient form for applying chlorine to this purpose. At present between 30,000 and 40,000 tons annually of this bleaching powder is obtained in this kingdom from the muriatic acid, which, 20 years ago, would have been wasted. Slaked lime, finely sifted, is placed in stone chambers, and the chlorine introduced. The chlorine gas was formerly obtained by operating in leaden vessels, on a mixture of manganese, common salt, and sulphuric acid. The residual mass was sulphate of soda, so largely contaminated with sulphur and manganese that only a rough and very inferior soda ash could be made from it. At present strong muriatic acid is introduced into stone vessels with manganese, and gently heated, causing the decomposition of the acid, which gives off its chlorine. Chloride of manganese remains, which at one time was employed in purifying coal gas, but for the present is a worthless product. One effect of this substitution of muriatic acid for the former mode of manufacture, has been to enable the maker to

supply bleaching powder at £10 to £12 per ton, which formerly was charged by them at £18 to £25 per ton.

Bicarbonate of Soda is made by exposing crystals of soda to carbonic acid, obtained by acting on carbonate of lime (chalk) with the muriatic acid. This bicarbonate of soda is largely used for domestic purposes—particularly in America in bread baking. Something like 10,000 tons yearly are furnished by Newcastle alone of an article, which was formerly supplied in such minute quantities by druggists, that upon one occasion, 40 years ago, an order for two pounds required the united stocks of three shops for its execution.

Oxichloride of Lead is another manufactured application of muriatic acid. Its nature and preparation are described under the head of lead and its compounds. The works at Washington, where alone this substance is made, is an instance of an establishment being founded to procure that muriatic acid, formerly looked on only as a residual and embarrassing product of a soda manufactory.

Magnesia is obtained by dissolving that earth from magnesian limestone by means of carbonic acid procured in the way just described. Soluble bicarbonate of magnesia is separated from the insoluble carbonate of lime. From this solution the *magnesia alba* of druggists is precipitated by heat, and it is then dried ready for the market. Exposing this substance to a moderately high temperature, gives calcined magnesia. This mode of obtaining magnesia is an invention of the late Mr. Pattinson, and is practised at Washington.

Pearl Hardening is the name given to a flocculent sulphate of lime, produced by dissolving lime in muriatic acid, and then precipitating by sulphuric acid. The former acid is displaced, and remains in the water of the solution ready to act on a further portion of lime. The precipitate is compressed to expel a portion of the water, and is then ready for use by the paper makers, who mix it with rags, for which it serves as a substitute in their process. Its mode of manufacture and employment in the arts were the suggestion of Dr. Jullion. The process is exclusively carried on at the Felling Chemical Works.

Before quitting a manufacture which has thus grown out of the early labours of Mr. William Losh, styled by a writer the father of the soda trade, the following particulars, copied from a paper on the Statistics of the Alkali Trade of the United Kingdom, will be perused with interest:—

Raw material consumed per annum—

	Tons.
Salt	254,600
Coal	961,000
Limestone and Chalk	280,500
Pyrites	264,000
Nitrate of Soda	8,300
Manganese	33,000
Timber for Casks	33,000
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	1,834,400
Capital employed	£2,000,000
Labour, exclusive of transit, but inclusive of miners, 19,140 men. Wages	£871,750 per annum.
Weight of raw materials and finished products transported tons	2,540,750 ..

Nearly one-half of these materials are worked up in the neighbourhood of Newcastle.

The salt employed is almost exclusively the produce of the Cheshire mines, but at the Felling works rock salt, from Ireland, is dissolved and boiled down by waste heat from coke ovens. There has, however, a discovery been made within the last month which may add considerably to the advantages of this already favoured district as a locality for the manufacture of soda. In a bore-hole in the new red sandstone, undertaken by Messrs. Bolckow and Vaughan, at Middlesbro', for obtaining water, a bed of salt of great thickness has been pierced.

Alkali Waste.—In our description of the process pursued in the manufacture of soda, we have seen how sulphur is called in to displace, in the form of sulphuric acid, the muriatic acid from the salt, and next, how in its turn this sulphur is withdrawn, by means of lime, from its new combination in the sulphate of soda. This operation gives rise to the generation of an immense quantity, probably 200,000 tons

or more annually, of a blue substance, known as alkali waste. When sulphur rose in price, and pyrites was still expensive, attempts were made to recover the sulphur from this product, which, in itself is a sad encumbrance and nuisance, partly from its bulk, and partly from the chemical reactions which are apt to take place when it is exposed to atmospheric influence. It was sought to be decomposed by the muriatic acid produced in the soda works, which causes a rapid evolution of sulphuretted hydrogen. This gas was burnt, and the resulting sulphurous acid conveyed to the chambers, and treated there in the ordinary way for converting it into sulphuric acid. This plan, from a variety of manufacturing difficulties was soon abandoned. More recently an attempt was made on a large scale to produce what was called "factitious pyrites." The alkali waste was fused in a blast furnace with the oxide of iron, obtained from the pyrites burners, and the sulphur was thus reunited with the same iron as it were from which it had been recently expelled. In this way an artificial sulphuret of iron was run out of the furnace, much in the same way as happens when pig iron is made. The lime of the alkali waste, combining with alumina and silica, got by adding clay in the furnace, formed a fusible slag, just as that which is seen at our iron furnaces. This factitious pyrites was burnt, its sulphur given off, and the iron returned again to operate on a fresh quantity of alkali waste. There was some difficulty experienced in getting the artificial sulphuret to give off its sulphur, and the manufacture of the factitious pyrites itself was not altogether free from objection. It was, after all, however, a question of price, but, looking at the usual impediments which beset all new processes, neither the cost of production nor the subsequent treatment of this substance were such as, in the writer's opinion, to render it impossible that ultimately this method of reproducing sulphur may be beneficially pursued.

Hyposulphite of Soda is obtained by exposing the alkali waste to the air—this furnishes oxygen, and forms hyposulphite of lime. The mass so changed is treated with carbonate

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of soda, which gives hyposulphite of that alkali. This is crystallized; and of it five tons per week are made at Walker, chiefly for the use of photographers and for bleaching.

Cement.—Alkali waste, when ground with the burnt pyrites, forms a tolerable cement, which can be substituted for ordinary mortar.

Neither of these purposes to which alkali waste is applied makes any sensible impression on the immense quantities produced.

Alum.—The introduction of the manufacture of alum into the north of England, embraces a history of some of the vicissitudes to which trade is subject. In the reign of Queen Elizabeth an ancestor of Captain Chaloner, of Guisbro', made himself acquainted, in Italy, with the process by which alum was made in that country; and recognising a mineral in the Cleveland Hills as likely to furnish this substance, he made the necessary trials, which ended in success, and, in return, incurred, it is said, the displeasure of the Pope of the day. Mr. Chaloner, however, persevered, and several works sprung up, some of which are continued to this time. The mineral employed is a shale, containing, of course, alumina, and with it bituminous matter, sulphur, &c. Once fired, its inflammable constituents enable it to continue burning; and the result is, a sulphate of alumina, which is washed out; sulphate of potass, or latterly sulphate of ammonia, is then added. These crystallize into sulphate of alumina and potass, or sulphate of alumina and ammonia, by which means impurities are expelled, and the alum of commerce obtained. A great inconvenience attending this process is the large amount of shale required—above 100 tons for each ton of alum.

About thirty years ago, a more direct way was adopted on the Tyne. Common potter's clay, from Dorsetshire, was slightly heated, ground, and treated with sulphuric acid. By lixiviation sulphate of alumina was obtained, as when the Cleveland alum shale was used, and the subsequent treatment remained the same in both instances.

The addition of the potash, or ammoniacal salts, being solely to effect crystallization so as to rid the aluminous sulphate of impurity, which is chiefly iron, about 1838 Messrs. H. L. Pattinson and Co. adopted the invention of Mr. Weiss, which consisted in precipitating the iron by means of prussiate of potass, and then boiling down the pure sulphate of alumina, so that it was solid when cold.

Of these two substances, viz., crystallized alum and pure sulphate of alumina, at one time, about 100 tons weekly were made on the Tyne.

Subsequently, it was ascertained, a sufficiently pure sulphate of alumina could be procured by using China clay instead of potter's clay; and as this substance can be manufactured at Manchester—which is its principal market—nearly as cheaply as on the Tyne, at the present moment not a single ton of alum is made in our district, although the successors in the method imported by Chaloner still continue, in the north of Yorkshire, to pursue an occupation which, however, is generally considered one of a not very remunerative character.

Copperas.—In the coal seams of the North, there is found a yellow fibrous mineral, interspersed with coaly matter, vulgarly called, from its colour, brasses. These brasses are bisulphide of iron, or pyrites. By continued exposure to the atmosphere they are oxidized, and converted into sulphate of iron, mixed with some free acid. An addition of old iron neutralises the free acid. The sulphate of iron is then crystallized, and forms the beautiful green salt known as copperas.

The produce of the district, according to Mr. Cuthbert Hunter, a manufacturer, is about 1800 tons a year, made at four works; and of it 1200 tons is made on the Tyne, and the remainder on the Wear. It is sent to different parts of the country and abroad, for dyers, &c. From a variety of circumstances the yearly make is much less than formerly. Twenty years ago, Mr. Hunter states, there were eleven makers of copperas in this district, who supplied 4000 tons per annum.

Venetian Red is extensively made on the Tyne by exposing copperas to heat in a reverberatory furnace, by which the iron is converted into a peroxide; the mass is then ground, and forms the pigment so well known in trade.

Prussiate of Potash.—The Rev. Mr. Hodgson, in his *Picture of Newcastle*, informs us, Prussian blue was first made by a Jew in Oakwellgate, in the beginning of last century. If this is correct, the commencement of this branch of our manufactures dates soon after the discovery of the substance, which took place in Berlin, in the year 1710, by a certain chemist called Diesbach. The manufactory was ultimately removed, 80 years ago, to Heworth, where it continues to be carried on by Mr. Thomas Bramwell. The price of Prussian blue at first was 42s. a pound, it is now under 2s. For many years the chemistry of the reactions which were called into play, in the manufacture of Prussian blue, were not at all understood; indeed, not until after 1825, when Gay Lussac discovered the existence of cyanogen, was any light thrown upon the nature of the process.

At present, animal matter such as horn shavings, woollen rags, &c., are placed with potashes in an iron pot, kept red hot, in which, by means of an agitator, the mass is constantly stirred. During the process, a portion of the constituents of the animal substances favoured by the presence of the alkali, rearrange themselves into a substance called cyanogen, which is composed of carbon and nitrogen. Cyanogen united with a portion of iron, and with the metallic base of the potass, constitutes the beautiful yellow crystals, ferrocyanide of potassium or prussiate of potash so familiar to many. Adding a solution of this yellow salt to another of a salt of iron, prussiate of iron, or Prussian blue, is generated.

These details are necessary, in order to understand an attempt which was made by Mr. Bramwell, about 20 years ago, to effect the union of carbon with nitrogen, obtained from less expensive sources. Charcoal was soaked in a solution of potass, and placed in upright earthen tubes, kept red hot, through which air was drawn. The combination between the charcoal and the nitrogen of the air, pointed out

by the theory, actually took place, but owing to the difficulty of maintaining the apparatus in order, and loss of materials in the process, the plan was abandoned after a loss of many thousand pounds.

About 5 tons weekly of prussiate of potash is made at Heworth. Its value fluctuates, for, being largely used in calico printing, its demand varies with the fickleness of the prevailing fashion. A few years ago, Mr. Bramwell stated, it rose rapidly to 2s. 6d. a pound, owing to a broad blue stripe in the printed dresses worn by ladies. Now, mauve and magenta, supplied by aniline, have depressed the value of prussiate, which is worth little more than 1s. a pound.

Epsom Salts, or sulphate of magnesia, were formerly made by burning the magnesian limestone, washing out the lime, and treating the residual magnesia with sulphuric acid. Now, the chief source is the saline mass, which remains from the mother liquors of the Yorkshire alum makers. This is furnished, after being neutralized by magnesian limestone, lixiviated, and the solutions crystallized. Above 50 tons weekly are made of this drug on the Tyne, chiefly by the Jarrow Chemical Company. Recently, magnesian salts have been occasionally imported from the salt works on the shores of the Mediterranean, the waters of which, as is well known, are unusually rich in these substances.

Artificial or Chemical Manures.—The area of a country being confined within certain limits, any discovery or pursuit which tends to augment its powers of production cannot be over estimated in importance. To those mechanical contrivances which have improved the fertility of our soil, Newcastle and the neighbourhood has added, perhaps, less than other places; but on the other hand, in the manufacture of stimulants, or artificial manures, this district has done its share in this national work. Bones, simply crushed, were first prepared at Scotswood, by Mr. Grace, sixty years ago. They were, in the beginning, gathered in the vicinity; but subsequently considerable importations from Germany were required to meet the growing demand. Dr. Richardson, of Newcastle, formerly a student in Liebig's laboratory at

Giesen, acting on that philosopher's idea, that previous treatment with sulphuric acid would render the bones of more easy assimilation by plants, commenced a work for the production of dissolved bones, as they are called. Bones are now recognised to owe their chief value to the phosphorus they have withdrawn from the land, in the nutriment of those animals which supply them. This phosphorus in the dissolved bones returns to its original source, viz., the soil. So important is it that this supply of phosphorus should be kept up, that large quantities of the dung of birds, or guano, is brought from distant countries. In our own, however—in Cambridgeshire, for example—within five or six feet of the surface is found a stratum, about a foot in thickness, of a peculiar-looking mineral substance. Examination and analysis proves this to be fossilized dung, containing 60 per cent. of phosphates. So valuable is this deposit that the owner of the land, from a royalty of 5s. to 10s. per ton, receives nearly the previous money value of his estate, as much as 300 tons an acre being obtained. This fossil dung, or coprolites, are almost useless until they have been treated with sulphuric acid. At present many thousand of tons, Mr. Thomas Colbeck states, are brought to the Tyne, the Humber, and the Forth, for the purpose of being converted into artificial manure. According to the Mining Statistical Returns, in 1861, 37,000 tons of these coprolites were got in Cambridgeshire. Besides the importations of guano, 8000 to 10,000 tons of chemical manures are yearly supplied by our local manufactories.

Sulphate of Ammonia.—In the manufacture of gas there passes over, and is condensed, a fluid known as gas liquor, which contains ammonia, chiefly combined with hydrosulphuric acid. This solution is treated with sulphuric acid, and boiled down, which separates crystals of sulphate of ammonia, a substance which finds a ready market with the alum makers, and artificial manure manufacturers.

Acetate of Lime.—Where wood cuttings are easily procured they are put in iron retorts, and exposed to heat. Charcoal remains behind, which is used in the iron foundries, and pyroligneous, an impure acetic acid, and tar distil over. To

the former, lime is added, producing acetate of lime. This acetate of lime on being distilled with sulphuric acid, gives the acetic acid, or vinegar used by the white lead makers. Acetate of lime was formerly made, on a large scale, at Walker, but it now is chiefly supplied by small works, in districts where wood cuttings are at hand.

Soap was first manufactured, Mr. Thomas Doubleday informs the writer, about 1770, or a little earlier, at the Westgate, by Lamb and Waldie. In 1813 Hodgson speaks of its production being carried on upon a large scale. In our own time, with a large population, and with the great facilities we possess of importing some of the raw materials, and of manufacturing the others, it is not surprising that important soaperies are still to be found among us. Mr. Thomas Hedley, himself a large maker, states that 4,500 tons are annually manufactured on the Tyne, none being made on the Wear. To obtain this there is employed—

2,300	tons of	tallow, palm oil, &c.
600	"	resin.
800	"	alkali (soda).
600	"	lime.
600	"	salt.
1,200	"	coal.

About eighty men are engaged in the soap works. The process is not one of a very complicated nature. The tallow, resin, &c., are melted in large pans of cast-iron, and the alkali dissolved in water, previously rendered caustic by being treated with lime, is added. After being boiled together, a combination between the alkali and certain portions of the other constituents takes place, thus forming soap. This is run into frames, and after solidifying is cut up, giving the ordinary bars of yellow soap so well known.

Grease, &c.—Grease is now in large demand for purposes of lubricating railway carriage wheels, and machinery generally. Palm oil, tallow, and other oily substances form the basis of all. It is said from 2000 to 2500 tons of such grease are annually made in one district. Immense quantities of the common dip candles are manufactured for the use of our mines.

GLASS, EARTHENWARE, AND BRICKS.

Glass.—Sand, known to chemists under the names of silica or silicic acid, possesses the property of uniting with the oxides of different metals, and forming a class of substances called silicates. Some of these have great transparency and beauty, along with the quality of great ductility when hot, and considerable strength and power of resisting atmospheric and other influences when cold. The increased fusibility conferred upon silicates, when two or more of the oxides are present, forming double silicates, secures additional transparency, strength, &c. This causes the different kinds of glass, as they are then called, to possess a somewhat complicated composition. The following analyses will sufficiently explain this :—Bottle glass contains in 100 parts about—

Silica	..	..	..	..	..	..	..	60
Oxide of sodium or soda	..	..	..	..	..	..	..	4
Oxide of calcium or lime	..	..	..	..	..	..	..	20
Oxide of aluminium or alumina	..	..	..	..	..	..	..	10
Oxide of iron	..	..	..	..	..	..	..	6

Window glass—

Silica	..	..	..	..	..	..	..	70
Soda	..	..	..	..	..	..	..	14
Lime	..	..	..	..	..	..	..	12
Alumina	..	..	..	..	..	..	..	4

Plate glass—

Silica	..	..	..	..	..	..	..	75
Potash	..	..	..	..	..	..	..	17
Lime	..	..	..	..	..	..	..	5
Alumina	..	..	..	..	..	..	..	3

Crystal or flint glass—

Silica	..	..	..	..	..	..	..	54
Potash	..	..	..	..	..	..	..	10
Oxide of lead	..	..	..	..	..	..	..	36

A brief inspection of what is wanted to compose glass (along with the existence of cheap fuel), will explain why Sir Robert Mansell, in 1615, located himself at Newcastle as a glass maker. For the commoner varieties, all the raw materials are to be found in the neighbourhood, and for the purer sand, required for the finer descriptions, our light returning colliers offer the necessary facilities of tran-

sport. The materials are well mixed, and introduced with more or less care, according to the kind of glass required, into a furnace, where they are partially fused or "fritted." The "frit" is then put into large crucibles or "pots," and heated until complete fusion takes place. The pots are heated in powerful furnaces, under those cones which contribute, perhaps, more than any other of our manufactories, to the cloud of smoke which hangs over the neighbourhood.

Probably no section of the manufactures of the Tyne and Wear has experienced more marked changes during the last 25 years than that of glass, during which period there has been witnessed a decadence of one branch and entire extinction of another. Nor is this all; for out of this partial wreck has sprung a state of activity which surpasses all that of the previous history of the trade. This revolution is, in a great measure, due to the removal of the excise duty formerly levied on glass, which not only pressed on the expansion of the trade, and consequent consumption of its produce, by the enormous tax of £75 per ton, but also, by an interference with the skill and ingenuity of the manufacturers, offered a barrier to any improvement in the process. Window glass was formerly worth £110 per ton, £75 being for duty, and £35 for cost and profit to the maker—this latter sum being required to cover the expense of a restricted production, and advances for duty. The present worth of the same article is £17 10s.—exactly half the manufacturers' former price; a fact which, it is hoped, will make governments pause before having recourse to so costly a mode of dealing with the financial arrangements of the country. Some fifteen or twenty years ago, any one walking down the river side, after passing the Glasshouse Bridge, might see an extremely curious process going on in the row of glasshouses of the Newcastle Broad and Crown Glass Co. Workmen were employed in dipping iron tubes into the large pots of melted glass, or "metal" as it is called by the trade, kept at a high temperature in the furnaces constructed for the pur-

pose. Out of the mass of metal which attached itself to the end of the pipe, a large hollow globe was blown, after one or two intermediate reheatings. When this globe had arrived at the proper size, a solid bar of iron was stuck into the opposite side from the pipe, and then the glass globe was separated from the latter, leaving, of course, an aperture at its former point of attachment. Exposure to a hot flame, and a rapid revolving motion communicated to the bar, opened out in a few seconds, by centrifugal action, the globe into a circular plate, about 6 feet in diameter, forming the crown glass of commerce. "Sheet glass" was made by the mass of metal being blown into an oblong spherical shape, flattened at the pipe end, and opened out at the lower extremity. The flattened end was detached, and there resulted a cylinder open at both ends, which was cracked down one side by heating it with an iron rod, and allowing a drop of water to fall on it. The cracked cylinder was spread out, and placed in an annealing oven, where, by a gradual process of cooling, it, and other kinds of glass are deprived of that brittle character this substance possesses when it loses too rapidly the heat under which it is manufactured.

At the time we are speaking of, six houses on the Tyne and three on the Wear laboured incessantly in making window glass. Now every furnace on the Tyne is extinguished, and only two establishments on the Wear are at work. In 1838, out of 120 tons, the weekly produce of the kingdom, 60 tons were made on the Tyne and 20 on the Wear. At the present time the produce of the Wear alone is exactly what it was formerly of the whole kingdom, viz., 120 tons per week, and of this Messrs. Hartley alone contribute 100 tons. It is obvious that a great economy in the expense of manufacturing was the result of such a change. Crown glass has almost entirely given way to sheet, for in cutting a circular table into squares, great waste ensued from the difference of shapes, and from the thick piece of glass, or "bull's-eye," as the point of attachment to the iron was called. The fact of the glass-blower being able to make

thinner sheets in crown glass than from the cylinders, was the cause of its being retained in spite of other disadvantages. (f)

Plate glass, instead of being blown, is generally made by running the metal on a large flat, perfectly level, and smooth metallic table, and passing a roller over it; after which it is annealed and then placed in the polishing frames, embedded in a horizontal position in gypsum. Here, by a reciprocating, as well as by a rotatory process of grinding, the rough plates are polished by the intervention of water and sand, the latter coarse at first, and succeeded by finer, until at the end colcother, a fine oxide of iron, is the polishing material used. Recently Messrs. Swinburne & Co. have applied cylindrical grinders, under which the glass is passed. These do the work so rapidly, than an operation which formerly required 24 hours, is now completed in half an hour. Previous to 1845, according to the excise returns, there was more plate glass made at South Shields works (now Messrs. Swinburne & Co.'s) than at any other works in the kingdom. At that time their annual produce was 312,000 square feet per annum: now they can turn out exactly four times this quantity. Besides this description of plate glass, every one is now familiar with a rough kind covered with small grooves or corrugations. This is rolled plate, the invention of our neighbour, Alderman Hartley, of Sunderland, who makes a million feet per annum, worth about £15,000.

Flint Glass was, until recently, an article of luxury, found only in the dwellings of those in comparative affluence. It was produced formerly in small quantities comparatively, by nine firms on the Tyne, and being elaborately cut and polished, was a very costly article. Some years ago, according to a leading manufacturer here, the workmen struck—several of the establishments were closed never to be re-opened, and the trade was transferred in a great part to Stourbridge, so that at present, the cut glass produced on the banks of the

(f) The following is a curious instance of the value and scarcity of window glass in the sixteenth century:—At Alnwick Castle the glass panes were only put into the windows when the Lord did lye there. During his absence, they were removed and stored safe till his return.

Tyne, where it had flourished probably for 230 years, is not equal to the make of one small work. In the meantime, a new department of glass industry has sprung up, which far exceeds in importance, its predecessor—this is the manufacture of pressed flint glass, in which the articles on being blown, are surrounded by accurately polished metal moulds, and thereby acquire a degree of brilliancy and finish scarcely inferior to that of fine cut glass. Under the impulse of this improvement, Messrs. Sowerby & Neville, who formerly made something like 3 tons of glass weekly, now turn out 30 tons. Six firms are engaged in this trade.

Bottle Making.—47 bottle houses on the Tyne, Wear, and Tees, turn out, annually, the incredible number of 50,000,000 of bottles. Alderman Ridley gives 30 men at each house, as the number employed, equal to 1,410 men in all, and 132,000 tons of coal consumed annually.

The writer is indebted to his friends, Alderman Hartley and Mr. R. W. Swinburne, for the bulk of the statistical information contained in the previous account of the glass trade. Both gentlemen allude, and with apparent justice, to many impediments offered to the legitimate and probable extension of the trade by the arbitrary conduct and obstructive regulations of the workmen engaged in the glasshouses. This compels our country, under the privileges free trade has conferred upon it, to import largely many articles of glass from the Belgian, and other nations, in which they are able, notwithstanding our other advantages, to undersell us. According to Mr. Neville, light cut wine glasses, where the material is only worth 2*d.* per pound, are brought from Belgium by our glassmakers at 1*s.* 4*d.* a dozen: a price at which they themselves are totally unable to manufacture the article. This is owing, Mr. Neville alleges, to labour being so much cheaper abroad than here. The writer is not altogether disposed to coincide in this view; certainly not as a general proposition. Free trade, if it has admitted duty free the results of foreign labour, also admits, on the same terms, that which sustains foreign labourers, viz., all articles of food; and the consequences are be felt abroad as well

as here. A very intelligent Scotchman, chief engineer on board the Baron Osy steamer, took his family 20 years ago, for the sake of economy, to live at Antwerp. The same considerations have induced him now to return to London; living, as he stated, being cheaper at the English end of his voyage than at the foreign. At the Belgian iron blast furnaces, it is true, the daily wages of the workmen are lower than in England, being sometimes only one-half of that paid here; but, again, this is equalised by double the number being employed on the same work. The final result is, the labour on a ton of pig iron costs what it does at the writer's own furnaces. It is far more probable that the rapid extension of the glass trade in our own country has outstripped the means of supplying a corresponding demand for the skilled labour required in the manufactories. This, time can only correct; for experience has taught iron makers and others how difficult it is to import from distant parts, even of the same country, large bodies of workmen; a difficulty greatly augmented when a foreign country is required to make good the deficiency, from individuals whose language, tastes, mode of living, and whose very amusements are so different from those of our own people.

Glass Staining.—In Newcastle are the works of Mr. Wailes, who has acquired great celebrity for his artistic designs in making stained glass windows. The raw material used at this establishment is purchased from the manufacturer, when glass of one colour only is required. When a design has to be painted on the glass, the necessary labour is bestowed on it at Mr. Wailes' works. Of artists and other classes of assistants, there are employed here 80 to 100. As a favourable specimen of Mr. Wailes' skill, reference may be made to the east window in St. Nicholas' Church of this town.

Earthenware.—None of the raw materials which enter into the composition of the common earthenware, so largely made on the three principal northern rivers, the Tyne, Wear, and Tees, are found in the district. The economy, however, with which they are brought here, coming as ballast;

the cheapness of coal; and the ready means of sending the produce of the potteries to various parts of the world, are circumstances which have conferred a position of importance upon this section of our manufactures. Potters' clay, a soft plastic mud resulting from the disintegration of former rocks, possesses, as is well known, the property of being easily moulded into any form; and, on being exposed to heat, loses its plastic nature, hardens, and retains its shape. Clay as it is dug from the earth in Dorsetshire, on being burnt, shrinks so much and is so liable to crack in cooling, that, before being employed in the potteries, it is submitted to previous treatment to correct this, as well as to free it from impurity. The rough clay is mixed with water to an extent which reduces it to the consistency of thick cream, thus separating the stony and grosser particles from the finer. Flints, previously heated red hot and then thrown into water to render them friable, are ground in water under heavy stones, and produce a liquid resembling that got from the clay. A small quantity of Cornish stone, which is a partially decomposed felspar, is ground with water, and this, with some China clay to improve colour, are added. This admixture deprives the clay itself of the tendency to shrink above alluded to, and at the same time confers strength. The whole is passed through extremely fine sieves, so that nothing is admitted to the subsequent process but the very finest particles. Iron is an impurity of a fatal character, producing yellow, reddish, or black stains on the ware; hence the liquid clay, &c., or "slip" as it is called, in running along the spout to its ultimate destination is generally made to pass a series of ordinary magnets, which, attracting nearly all the ferruginous particles, obviate almost entirely the inconvenience caused by their presence in the native clay. The slip is run into large hearths of fire-clay ware, and surrounded by an edge so as to retain the liquid in the so-called "slip pan." Heat, applied below, expels the water, until the resulting mass attains a state of the desired consistency. After being well worked up, so as to have the clay solid and uniform in

texture, it is ready for the potter. A skilful "thrower" seizing a morsel of the clay, the quantity being guessed at with extraordinary accuracy, dashes it on a horizontal revolving disc, and, as if by magic, a vessel rises up under his fingers. So rapidly is this done, that a good workman can turn out 3500 to 4000 bowls or cups for his day's work of 10½ hours. The articles as they leave the thrower's hands are soft, and easily lose their shape. To avoid this they are carried away, by children, on boards, into stoves, where they are partially dried, sufficiently so to bear being put on a lathe, where the outsides are turned down with great speed to the exact shape. The ware thus prepared is placed in the "seggars," a vessel of fire-clay; and multitudes of these, so filled, are "set" in a large cone, or kiln, heated by means of several fires placed round its exterior. The seggars preserve the shape of the ware, and at the same time prevent its being contaminated by the smoke and impurities of the fire. After 50 hours' firing the ware is removed as "biscuit." The biscuit is then dipped in a finely-ground creamy-looking glaze, previously fused from a mixture, in which borax and white lead, ground flint, &c., form the chief ingredients. After this the ware is placed again in seggars in the gloss kiln, and in 15 to 17 hours is drawn as ordinary white or "cream-coloured ware," by which latter name it is known in the market. In the manufacture of printed ware the pattern is printed on tissue paper, which is immediately laid on the biscuit. The porous nature of the ware absorbs the oil, and, with it, the colouring matter so retentively, that on plunging the different articles into water, by moderate friction the paper is removed, leaving the printed pattern adhering to the ware. Exposure to a low heat burns off the oil, after which it is immersed in the glaze, as before, and fired in the gloss kiln—the vitrification of the glaze permitting the pattern being seen underneath. Common painting is done by hand, and in other respects the subsequent treatment is the same as when printed ware has to be produced. To some extent machinery has superseded the labour of the thrower in certain articles in large demand.

Besides ordinary "thrown" articles, a large quantity of goods are made by flattening the clay out, and pressing it into forms of plaster of Paris. Plates are made in this way, and in such large quantities, that upon one occasion an order was received for 12,000 dozen by a house in the town of Newcastle.

To Mr. Wedgwood, of Etruria, in Staffordshire, the world is indebted for the process and mode of manufacture pursued in our common earthenware works. It was commenced by him in 1710, and about 1730 a Mr. Warburton built a pottery at Sheriff Hill, for making similar goods. When the Rev. Mr. Hodgson wrote his *Picture of Newcastle* in 1813, although Warburton's example had been followed both on the Tyne and Wear, a good deal of earthenware was still imported to Newcastle; but this has long since ceased. Besides white ware, there is a considerable quantity of a coarser kind produced in the district, in which common yellow clay is the material used. This quality goes by the name of brown ware.

The following information kindly communicated by Mr. Christopher T. Maling, shows the extent of the potteries in the north:—

		No. of Potteries.	USED YEARLY.			Men employed.
			White Clay. Tons.	Brown Clay. Tons.	Coals. Tons.	
On the Tyne	..	13	12,000	3,000	34,000	1,200
" Wear	..	2	4,000	1,500	14,000	500
" Tees	..	4	5,000	..	13,000	500

Besides about six smaller ones in other places, making chiefly brown ware only.

Tobacco Pipes, an article of large consumption, are made in immense quantities in small potteries exclusively employed in their manufacture.

Fire-Brick.—With so large a consumption of coal as is taking place constantly around us, some refractory material for our furnaces is evidently an imperative necessity. We have seen how silica, united with certain metallic oxides, known as earths, form, when two or more of the latter are

present, fusible compounds, known under the general term of glass. Separately all these substances are among the most infusible forms of matter with which we are acquainted, the highest heat we command in our furnaces having failed to affect them; any two of them, indeed, are extremely difficult of fusion, even when intimately blended. Pure silica, or a sufficiently near approximation thereto, is not a rare substance, but although refractory, it is too liable to crack, to serve generally as a material for our furnaces. In like manner all the simple earths are either too rare, or have super-added to their refractory nature some property which prevents their profitable application. Nature, fortunately, in giving us coal, has interspersed this treasure with seams, or beds, of a substance capable of resisting for a long time all the heat our hottest furnaces can produce. This substance, known as fire-clay, consists essentially of silica, with sufficient of the plastic earth alumina, to enable the mass to be easily worked and moulded previous to being baked, and constitutes the raw material out of which our fire-bricks are formed. Apart from foreign substances, which are either harmless, such as water and organic matter, or others better absent, fire-clay consists of 55 to 75 of silica with 45 to 25 of alumina. Great care is observed in selecting or mixing these different qualities of clay according to the nature of the goods required. The progress and actual condition of this branch of our manufactures is interesting, not only from its own importance, but also as being a correct indication of the development of other departments which depend, as ours do, on consumption of coal. To enable us to judge of both, the following figures, communicated by Mr. Joseph Cowen, Jun., are submitted:—

In 1838, or 25 years ago,

The fire-bricks made and used in this locality was estimated at		2,500,000
Do., and sent to other parts of the United Kingdom	.. .. .	3,000,000
Do., and exported to foreign countries	.. .. .	1,500,000
		<u>7,000,000</u>

In 1863, we make and consume here, it is estimated		43,000,000
Do., send to other parts of the United Kingdom	.. .. .	27,500,000
Do., and export abroad	.. .. .	9,500,000
		<u>80,000,000</u>

K K

Besides this enormous increase on the Tyne, fire-brick works in the Auckland district have sprung up in consequence of the rapid rise of the Cleveland iron trade.

In addition to this vast number of bricks, weighing 250,000 tons, the trade derives additional importance from a variety of other articles made of fire-clay. Of these, the most important are gas retorts, formerly of iron, of which 12,000 are annually manufactured, and sanitary pipes which are produced to the extent of 175 miles a year.

About 50,000 tons of fire-clay is annually ground to serve as mortar in building fire-brick work, to this must be added the clay used in manufacture of bricks, &c., say 295,000 tons, making in all 345,000 tons of this useful substance, yearly furnished from our coal measures. It is estimated 3500 men and boys are engaged in the fire-brick works, receiving annually for wages, £110,000. Not less than 150,000 tons of coal a-year are consumed in the fire-brick works. The manufacture is simple: the fire-clay is exposed to the atmosphere, the longer the better, to weather, which enables impurities to be easily separated. It is then ground, mixed with water and "pugged," and from the prepared clay, bricks are moulded in the usual way, dried on hearths or floors, and burned in close kilns.

Brick Earth, for the manufacture of bricks, occurs almost everywhere in the north of England, lying immediately underneath the soil. In freedom from stones, and tenacity, of course, there exists considerable variation. Every one is familiar with the ancient and simple process of brick-making. Digging the clay, and allowing it to temper over the winter, was the first stage; after which, in spring time, a moulder, with proper assistants, turned out at his table about 2500 bricks for his day's work, which were spread on the ground to dry—an operation attended, of course, with interruption and loss from bad weather. When the bricks were sufficiently dry, they were piled in large heaps in regular layers, with small coal between, and burnt. The great demand for this useful article, consequent on our extension of trade and increase of population, required some improved mode of making even so simple a thing as a brick, sold as it

is for about a guinea per 1000. The winter's tempering is dispensed with. Clay, fresh from the ground, is tipped into a "pug mill," where, with a little water added, machinery does in a few minutes what a winter's frost was previously required to effect. The clay ready for brick-making, leaves the pug mill in a continuous stream as it were, and by properly adapted machinery, it is compressed into a second stream, the breadth and thickness of a brick. A very simple arrangement cuts this into suitable lengths. Large floors, covered with a shed, and heated below by fires, dries in one day, winter and summer, the produce of the brick-making machine, and enables an amount of work (according to Mr. Richard Cail) to be done in 8 or 10 acres, which, under the old mode, would have required 170 acres. All this, as may be supposed, is effected at a considerably decreased cost. About 250 tons of bricks are daily turned out of that gentleman's works at Gateshead, and with such expedition, that clay, within a week from the day it was lying in its natural bed, may be forming a portion of the walls of those houses which are springing up with such rapidity on every side.

MISCELLANEOUS.

Oil, &c.—About 30 years ago, any one passing down the Tyne, during the latter part of the year, might observe at Dent's Hole two, or it might be three, vessels, larger than the ordinary run of ships seen there, and strengthened with more solidity than elegance about the bows. Judging from their weather-beaten appearance, the extra timber was no more than was required; nor was it so in fact, for their ribs had to withstand many a close hug and many a hard grip among the islands of ice they had to encounter in the northern latitudes in which they traded. These ships were, in short, the whalers of the port of Newcastle. The continued slaughter among the objects of their voyages, at length went far to reduce whales to the position of the extinct animals of our globe, and for the last thirty years, from the cause

assigned, according to Captain Palmer, an old whaling commander, no whaler has left this river. Whitby, Hull, and other ports have followed our example; and at the present moment, Mr. Palmer states, the last ship, one from Peterhead, is about to discontinue her annual voyage of hardship, uncertainty, and risk. Fortunately the universal application of gas has rendered us independent of those oil lamps which were fed by our whalers; but, on the other hand, the immense extension of mechanical contrivances has greatly augmented the demand for lubricating substances, and for these we should have been greatly inconvenienced, had the vegetable kingdom not been in a position to furnish us with the needful supplies.

Palm and other oils from tropical climates enter now largely into consumption for purposes created by our rapid extension of trade, but, as far as our local manufactures are concerned, the most important is the oil obtained from linseed. The seed, chiefly imported from the Baltic and the Black Sea, is subjected to a gentle heat, and then crushed under powerful edgestones or rollers, revolving as well as travelling over a flat surface. The linseed, thus prepared, is placed in small bags, and several of these so filled are submitted to great pressure, by means of powerful hydraulic machinery. In a very short time the oil contained in the linseed, under the continued influence of the force so applied, is expelled from the vegetable fibre, and is received in proper cisterns placed for its reception. The solid portion, known in commerce as oil cake, is of value for feeding cattle as well as for manure. Mr. Joseph Clephan has obligingly communicated the following data in connection with the oil trade of Newcastle:—The three oil mills on the Tyne consume annually 25,000 quarters of seed, the usual value of which is 45s. to 50s. per quarter. Exceptional circumstances have at present raised the price to 65s. About 1010 tons of oil are obtained from the above-named quantity of seed. The value of linseed oil is now £45 per ton, but £28 to £36 is its general selling price. Something like 3594 tons of oil cake comes from the Tyne mills, worth now about £10 per

ton. Owing to the perfect machinery employed in the oil mills, superseding as it does manual labour to a great extent, not above 30 men are engaged in this branch of manufacture.

Flour Grinding.—Hodgson, in his *Picture of Newcastle*, alludes to the picturesque effect produced by the numerous windmills which crown the eminences surrounding Newcastle; and so recently as 20 years ago, the origin of the “Windmill Hills” was sufficiently obvious in the outlines and general features of the landscape. These structures are fast disappearing, and their places being supplied by one or two enormous structures in Newcastle, besides others of lesser note.

Mr. Brown, of the Newcastle Steam Mills, has communicated the following information;—In 1822, 37 windmills, containing 99 pairs of stones, ground weekly 1110 quarters of wheat; 6 water-mills ground 270 quarters; and 8 small steam flour-mills 880 quarters; together, 2260 quarters per week. At present the two large steam-mills in the Close, with 16 pairs of stones each, consume weekly 4200 quarters; 8 small steam-mills 2250; 2 water-mills 150; and 5 windmills about 150; in all 6650 quarters, producing 9750 sacks of flour.

In the larger establishments all the most recent improvements in grinding are applied. A very simple one of introducing a blast of air to cool the flour, heated by the friction of the stones, enables the miller to increase his work 50 per cent.

Tobacco.—The practical effect, among our sturdy miners and stalwart workers in iron, of King James’ famous Counterblast against this favourite weed, may be judged of by the following facts, received through the kindness of Messrs. Harvey, the largest manufacturers in the place:—

	lbs.
In Newcastle there are three firms who turn out manufactured tobacco yearly about	836,000
Sunderland and Shields contribute about	327,000
Alnwick, Stockton, and Hexham about	420,000
	<hr/>
	1,583,000

Or above 700 tons.

The raw material, or leaf tobacco, comes from the planter in America, through an individual called a "stemmer," who partially deprives the leaf of the stems, and who generally, in whole or part, retains an interest in the commodity until it reaches the manufacturer through the intervention of London consignees. The value of the leaf is from 1*s.* 3*d.* to 1*s.* 6*d.* per pound, to which prices it has risen from 6*d.* to 8*d.* since the civil war in the United States. Besides this, there is known in the market Greek leaf, which sells at 5½*d.*; German at 6½*d.*; Dutch at 8*d.* to 9*d.*; and South American at 10½*d.* to 11*d.*, to all of which rates about 3*s.* 2*d.* per pound has to be added for duty. The manufacture is a very simple matter. The leaf is damped, placed in frames about 2 feet square, and 12 to 15 inches deep, and then submitted to pressure by hydraulic machinery. It leaves this operation as a cake 3 or 4 inches thick, and is then placed in the cutting apparatus, where, by a self-acting motion, it is rapidly converted into fine shreds. It is next damped by steam, and partially dried, when it is ready for market. Twisted tobacco is spun from damped leaves by means of the simplest machinery, and then compressed under screws, or it is formed into slabs such as cavendish, by being pressed without previous twisting. No snuff is ground here now, the tobacco being prepared and sent chiefly to Scotland for this purpose. For snuff making, the leaf is previously damped and partially fermented before being delivered to the mill. The value of the tobacco when manufactured varies from 3*s.* 4*d.* to 4*s.* 4*d.* a pound, and the duty on that manufactured and sold in the northern counties will be close on £250,000.

About 200 people are employed in the manufacture in Newcastle alone, besides steam power.

The trade has been carried on in the town for above 100 years—the predecessors of the Messrs. Dickinson, who still carry on the business upon a large scale, being the first to engage in it.

Flax Manufactures, &c.—Until recently, two mills, of considerable power, gave employment to from 400 to 450 workpeople in spinning linen yarns. Adverse circumstances

led to their being discontinued a few years ago. At present the manufacture of canvas alone is carried on at Newcastle. Of this, above 800,000 yards, according to Mr. Thomas Stokoe, are annually woven, and of it three-fourths is the produce of power looms, and the remainder is from hand loom work. From 120 to 130 men are employed in its production.

Grindstones.—A Newcastle proverb declares a Newcastle grindstone is to be found all over the world. If there is truth in the adage, it must be rather in the extreme durability and excellence of our grindstones than in the extent of production, for, from actual returns, it would not appear that above 100,000 stones, weighing 10,000 tons, leave our quarries annually. The chief supply of this article is derived from a stratum of sandstone, or “post” as it is technically called, on the top of Sheriff Hill. The total value of the grindstones quarried in the locality will be £12,500.

Building Stone is furnished in great quantity and of high excellence by the beds of sandstone in our coal measures, costing at the quarries from 7*d.* to 1*s.* 3*d.* per cubic foot, according to their size. All the stone used in the street architecture of the town is the produce of the immediate neighbourhood.

Cements.—In nature certain minerals are known to exist, which possess the property, on being calcined and finely ground, of forming, when mixed with water, an extremely hard cement, endowed with the additional valuable attribute of hardening under water. Careful analyses of these minerals have enabled the cements obtained from them to be successfully imitated; and, their component parts being inexpensive, and brought to the Tyne as ballast, the manufacture of artificial cements is carried on somewhat extensively on its banks. For the various kinds known as Portland, Roman, and others, Messrs. Johnson, of Gateshead, alone use annually 18,000 tons of chalk, the same quantity of coal, 500 tons of natural cement stone from the coast of Essex, besides a quantity of gypsum, &c. From this nearly 11,000 tons of cement are produced, worth about 45*s.* per ton. To secure

the conditions favourable to chemical action, upon which the effects of cements and mortars depend, the materials require not only to be calcined, but reduced, by more than one process of careful grinding, with suitable machinery, to a state of the most impalpable powder. Portland cement is largely used in hydraulic works at docks, piers, &c., as well as for imitation of ornamental stone work. Recently, too, it has been used for protecting the rivet heads and seams in iron ships from corrosion. 150 men are employed in the manufacture of cement.

Flanked, as we are, by the mountain limestone on the west, and the magnesian on the east, all our own requirements for lime are more than amply met by burning these minerals in the usual way. Plaster of Paris from gypsum, and Roman cement, as it is called, from the natural cement stone of the lias works, are also prepared in moderate quantities.

Hat-Making.--There are probably many inhabitants of Newcastle who daily pass the quiet-looking court known as Wellington Place, in Pilgrim Street, without dreaming that in it, is a manufactory for making hats and caps of various kinds, 300 to 350 people being employed in the work. This branch of trade in our town can boast of considerable antiquity; for, in 1546, felt makers, with curriers and armourers, formed one of the guilds of Newcastle. According to Mr. Wilson, the proprietor of the establishment in Wellington Place, no trade has suffered more from the obstinacy of the workmen, engaged in its prosecution, than that of hat-making. Formerly, England imported hatters' furs largely, and exported manufactured hats. This is reversed, and at the present time she exports her native furs, and imports the finished article. A combination or union among those whose true interests lie in promoting every improvement in their business, has, systematically, since the year 1604, resisted every attempt to keep the trade in our own country, by proscribing the application of machinery and other methods of reducing the cost of their produce. This has led to the condition of the trade just described.

In the establishment of Messrs. Wilson and Co., this fatal prejudice appears to be giving way, and to that firm belongs the merit of having introduced, after great labour and expense, an extremely ingenious combination of mechanical contrivances for "felting." We may, therefore, hope that a trade, which was pursued on an extensive scale in several of our northern towns, may shortly experience a revival.

Silk hats are made by covering a "body," generally of cotton cloth, waterproofed by certain solutions of gums, with silk plush. This occupation requires the services of about 70 people in the works at Newcastle, and about a similar number in that of the old firm of Messrs. Anderson and Miller, in Gateshead.

The process of felting is of a peculiar character, and depends on the property certain furs and wools possess of uniting with sufficient tenacity, to produce a fabric of considerable strength. To effect this they are laid out (formerly by hand) in a loose layer, with the fibres running in every direction, and then exposed to moderate pressure. This faculty is, in some instances, increased by roughening the fibres, which is done by moistening the fur with a mercurial or other solution.

The body of a hat, in the first instance, is made of a conical shape, and afterwards, by moistening the fabric, the apex of the cone is flattened down, forming the crown, and the base turned outwards constitutes the brim of the hat. In the common mode of felting this cone was made in two halves, each of a wedge shape, and the two pieces joined by loosening their respective edges, and interlacing the fibres thus opened, which were caused to unite by subsequent pressure.

Messrs. Wilson's is a great improvement on this manner of operating. The fur, of 1500 dozen hares, rabbits, &c., is stripped off the skins every week, by rapidly revolving knives. The fibres are subsequently blown along a box 80 or 90 feet long, by a fan-blast, which propels the finer particles the longer distance, and deposits the coarser nearer at hand. This enables the manufacturer to sort his material into different degrees of fineness. L L

The furs thus sorted, and different varieties afterwards mixed in an ingeniously contrived machine, are submitted to the action of a brush, by which they are propelled through another tube. At the end of this tube is a cone of thin copper, pierced all over with small holes, and revolving with great velocity. At the same time a fan, making 3500 turns per minute, draws the air quickly from the interior of the cone, and to fill up the void thus caused, air rushes in at all the small holes, so that the cone itself becomes a focus, as it were, towards which air from every side is streaming. The effect of this is, that as the light fur comes within the influence of the current, it is drawn on to the surface of the cone, and adheres there by the pressure of the blast. In a very short time the cone has accumulated fur enough to form the felt. The fibres possess sufficient adhesion among themselves, that when covered with a cloth, and then with another perforated cone, they can, when moistened and compressed, be felted in the ordinary way.

Wool is felted by being first formed into a "sliver," which is a long riband, so to speak, of loose wool. The sliver is wound round revolving cones, and compressed by an arrangement of mechanism which would require drawings for its proper explanation.

At Messrs. Wilson's the felt, thus prepared from fur or wool, is fashioned into hats, waterproofed, and dyed.

The total number of persons engaged in the town is 500, by whom 500 to 600 dozens of hats and caps are manufactured per week.

Paper.—Rags, the raw material used in the manufacture of paper suitable for printing and writing, are supplied from a source incapable of indefinite extension. They have, in consequence of the immensely increased demand of late years, risen greatly in price; and rags, which formerly were bought at £4 to £6 per ton, are now with difficulty obtained at £9 to £12. Not only can this species of raw material not be manufactured expressly for the paper maker, but almost any fibrous substance capable of being converted into a fine thread, would have been of more value for textile

fabrics than for the paper mills. One effect of the enhanced value of the rags has been a better produce of paper from the same quantity of the raw material; as well as the application, by the manufacturer of those substances which were formerly considered as valueless. Straw, rasped wood, and, as has been mentioned under chemical manufactures, precipitated sulphate of lime have all been added to rags to swell out the available material fit for paper; but the most important addition is a coarse grass, growing in sandy places on the shore of the Mediterranean Sea, called *Esparto*, a substance which has been used for many years as an article for ropes and mats. To Mr. Routledge, the present proprietor of the Ford Mill, near Sunderland, is due the merit of improved methods in dealing with this *Esparto* at the paper mills. Large numbers of heavy cargoes of pyrites and lead ore are brought to the Tyne, the ships bringing these carry with facility so light a substance as the *Esparto* grass; and in consequence, Newcastle imports it, not only for its own consumption, but also for the paper mills in Scotland, Lancashire, &c. In 1860 there were brought to the Tyne 1224 tons, in 1861, 2613 tons, and in 1862, 9534 tons of this valuable substitute for rags.

Mr. W. H. Richardson has kindly supplied the following figures connected with a manufacture of no small importance :—

	Tons.
Coarse materials for brown paper, such as old ropes, there is used in Northumberland and Durham, per annum ..	5,200
Rags	4,000
<i>Esparto</i> grass	2,000
Bleaching powder	400
Soda ash	200
Coals	35,000

Twelve firms are engaged in the trade, working ten machines for white and nine for brown paper; and of the former there is yearly manufactured 3500 tons, and 4500 tons of the latter; in all 8000 tons, which is about one-twelfth of the produce of the United Kingdom. The value of this local make is about £300,000. Among our makers of the finer descriptions, the house of Messrs. Annandale enjoys a high reputation. No process can be more beautiful than that going on, in their, or in any of the best mills in our vicinity.

To witness foul rags cleansed, bleached, torn to pieces, and reduced to the finest pulp, and then admitted on to the endless gauze-web of these machines as a perfectly mobile fluid, and in a few seconds leaving it as a perfect and continuous sheet of paper, is one of those triumphs of mechanical skill of which our age may indeed be proud. The extension of the daily press has added immensely to the demand for paper. The *Times* newspaper, it is said, works up daily 40 acres, covering it with from 70 to 75 acres of printing.

Tanning.—Mr. Edward Richardson, whose family has been connected with this branch of our manufactures for many years, sets down its introduction in our town to a very remote period. According to the late Mr. T. C. Angus, it occupied, not very long ago, so important a position here as to have gained for Newcastle, in the trade, the title of the Leather Metropolis of the North. Since that time, in one of the most important branches, viz., the importation and tanning of Russian hides, Leeds, of late years, has far outstripped us; on the other hand, the Newcastle tanners have risen in the scale of importance in the preparation of seal, sheep, and calf skins. Importations of raw hides, on a large scale, used to come to us from Denmark, Holland, and Germany. This has not only ceased, but actually the same article is being exported to these countries from Ireland. Mr. Angus, shortly before his death, kindly furnished the following data connected with the leather trade of Newcastle for 1862 :—

		Number.		Tons.		Value.
Butchers' hides	..	38,020	..	713	..	£24,908
Calf skins	..	62,124	..	84	..	9,320
Sheep do.	..	46,452	..	..	..	2,322
Seal do.	..	163,000	..	873	..	40,750
						£77,300
				Tons.		Value.
Bark used	..	..	..	1780	..	£9,753
Valonea	..	..	..	154	..	2,202
Shumac	..	..	..	314	..	4,315
Dyes	..	..	..	..	..	800
Oil	..	..	..	118	..	5,310
Eggs	..	..	..	..	..	600
Lime, tallow, &c., &c.	..	..	..	..	..	2,756
						25,736
						£103,036
Total value when manufactured						£135,659

Beverages.—The hundreds of furnaces glowing all round us, cannot be worked without the persons of those attending them being exposed to influences productive of extreme evaporation. The Whittle Dean Water Company have largely added to their powers of filling up the void occasioned by this exhaustive process, as well as by that large increase generally, of the application of water which our extended commerce demands. In 1838, the works of that company were capable of supplying 480,000 gallons of water per diem, at present their powers are adequate, for a drain of 4,700,000 daily upon their resources.

In the year 1852 the malt made in Newcastle, according to information obligingly communicated by Mr. Fraser, of the Excise Office here, was 145,460 bushels; during last year it reached 214,875 bushels. In 1852 the beer brewed, according to official return, was 110,534 barrels, against 130,646 for 1862; and, on the same authority, it would appear that the beer made in Newcastle does not amount to one-third of that brought from other places and consumed in the town and neighbourhood (g).

Coach-building.—The demand for the produce of our coach-builders has largely increased within the last 35 years, previous to which there were, probably, not half a dozen private carriages kept in the town, and the only public conveyances, beyond a post-chaise or two, were sedan chairs. At present there are in Newcastle three large coach and harness manufactories, which turn out not only vehicles of every kind for use on ordinary roads, but also those large and very expensive carriages used on our railways. The number of hands, according to Mr. Philipson, who are employed in carriage-building, is from 300 to 400, assisted by a considerable amount of excellent machinery. About 1000 carriages are annually manufactured in the town. The position of Newcastle, by conferring great facilities in

(g) No spirits are now manufactured in Newcastle, though, previous to the year 1852, a somewhat large distillery was carried on in the town. At this period, but a small quantity of spirits was received from other places, either under bond or duty free. The quantity of spirits brought into Newcastle, in the year 1862, under bond, and on which duty has been paid here, amounts to 109,951 gallons. If the spirits received, duty paid, be added to the quantity received under bond, it will not be going beyond the mark to say that the whole will exceed 250,000 gallons in one year.

obtaining timber, iron, &c., as well as possessing ready means of delivering the produce by rail, has immensely increased the importance of this branch of trade within the last 25 years.

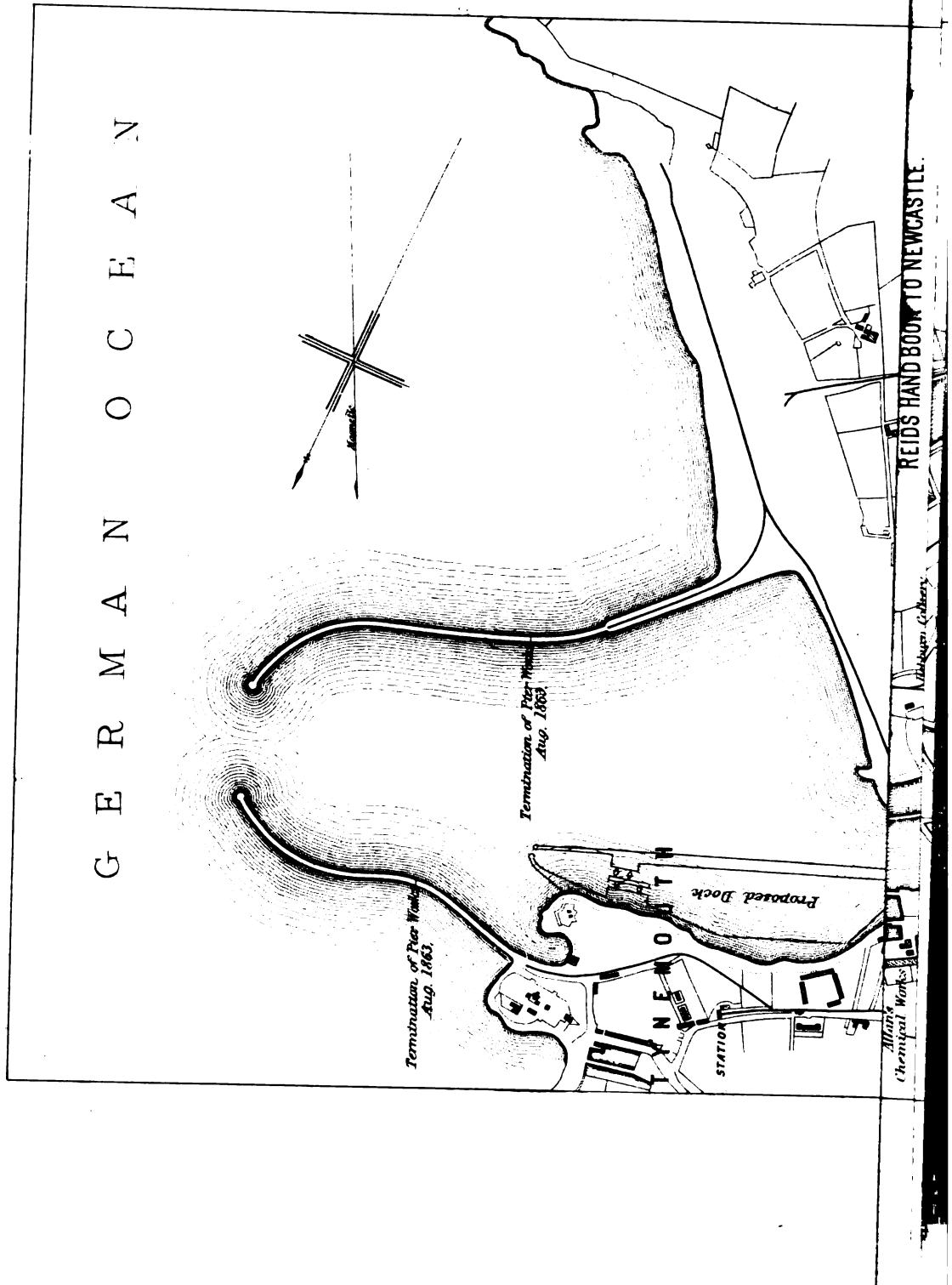
General.—Of course, in a town such as Newcastle, having large requirements of its own, and being, moreover, called upon to assist in supplying all the necessities of an extremely populous and flourishing district, cabinet-making, and every other species of establishment which the private wants of society, of every station, can demand, are to be found within the precincts of our ancient and now greatly extended town. The shops themselves have of late years greatly improved, and rank among their customers the inhabitants, not only of Newcastle itself and the adjoining neighbourhood, but also those of some of the large towns in the vicinity.



THE TYNE AS A PORT.

THE breadth of territory drained by any of our three northern rivers is not such that any very considerable volume of water finds its way to the ocean through their channels. This, and natural peculiarities in the surface of the country, through which they flow, occasionally impairing the depth of water, have rendered it necessary to adopt artificial means in order to meet the growing requirements of our commerce. The increased number of vessels now frequenting the ports, as well as the larger class navigating our seas, have rendered imperative enlarged powers of accommodation, as well as improved depth of water. To assist in finding outlet for our trade, docks have been formed at Hartlepool, at Seaham, and another is now being constructed at Blyth. The authorities charged with the care of the Tees are engaged, with all the activity their means permit, in adding to the facilities possessed by that river. At Sunderland, out of an

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insignificant stream, a channel has been formed capable of admitting ships of large burden ; and recently immense and very costly docks have been found indispensable for accommodating, at that place, the thriving trade of the Wear. The Tyne, whose capabilities were superior to those of either of her neighbours, was the last to feel the necessity of adding, by art, to those powers conferred by nature ; and at the present time the Commissioners are busily engaged in carrying into execution a scheme for improvement, which in extent, in importance, and, it is to be hoped, in ultimate results, will exceed any works of a similar character in any part of the kingdom.

No subject connected with engineering is attended, during its execution, with a greater diversity of opinion than that of attempting to improve a navigable river. Each stream has its own peculiarities—variations in the mode of receiving and disposing of its feeders of water, in its bed, and in the character of its junction with the ocean—all prevent, to some extent, the experience gained at other localities being applied with that exactness, to river works, which prevails in other branches of the engineer's profession. Again, during their construction, and until certain portions have been completed, the results obtained in depth of water, direction of the current, &c., are frequently the very reverse of those aimed at and ultimately attained. The labours of the River Commissioners who superintend the extensive alterations going on in the Tyne, have not been exempt from those forebodings of failure which usually accompany enterprises of a similar character elsewhere. Fortunately, however, for the prosperity of our commerce, their operations are sufficiently advanced to enable them to point to the actual realization of a portion of their expectations, in connection with their improvements. Not very many years ago, perhaps 25, a sail down the Tyne offered many points of exceeding beauty. Incredible as it may appear to any one making the voyage at the present day, when its banks, almost from Stella to Shields, are one continuous line of factories and workshops, so recently as a quarter of a century ago, there were many pretty fringes of

wood on its rocky shores, and rich crops grew to the very water's edge. In this now imaginary excursion ample opportunity was not unfrequently afforded of enjoying the surrounding beauties, from the steamers, of a very moderate draught of water, being unable to pass one or other of the sandbanks which at that time impeded their passage up and down the river. A detention of three hours was not uncommon so recently as four years ago.

In every stream, at the confluence of the land flood with the tidal water, there is generally deposited, as is well known, a mound of sand known as the "bar." In nature and extent this, of course, varies with different rivers. In the case of the Tyne, it formed a barrier to our navigation of a very formidable character. Passage, for many hours before and after high water, was impracticable, and at all times extremely dangerous in tempestuous weather, from the heavy breakers which rushed over the shallow depths of water. Enormous and most costly piers are being projected far into the sea, from both banks. These not only place the management of the depth of water, from the shelter they afford, under control, but also by enclosing, as it were, a large area of deep sea, exclude the waves, so that vessels at once run into a commodious and safe harbour of refuge. To remove the sand thus accumulated at the mouth of the river, gigantic dredgers are to be employed—two of which, the largest in the world, are already at work—obtained at a cost of about £47,000 each, and capable of raising from the bed of the Tyne 7000 to 8000 tons of soil per day. A similar one to these will be put to work shortly. The Commissioners have now five dredgers engaged, excavating 3 millions of tons annually, a quantity which will soon be increased to 4 millions of tons. The use of these powerful machines has greatly reduced the cost of dredging. That which, with less perfect apparatus, cost 1*s.* to 1*s.* 3*d.* per ton, is done now for less than 3*d.*, viz., 2*·*9*d.* per ton.

By the use of these powerful dredgers—by confining the waters of the river within narrower limits than those in which they formerly flowed—by straightening the channel,

and with it the current, so as to increase, by this means, the scouring power of the river itself—and by the removal of obstacles of various kinds, against which it expended its force, an immense improvement is looked for in the navigation of the Tyne.

Under the combined influence of these efforts, Mr. Ure hopes to deepen the channel for 20 miles inland, to such an extent as to admit vessels of the largest tonnage to Newcastle, and those of 400 tons, and screw steamers of 1200 tons, to places above the town—the old Tyne Bridge being removed, and another, with an opening to admit ships, erected in its room. A depth of 30 feet at high water near the sea, and 25 feet above Newcastle, is aimed at. Docks have already been constructed by the Commissioners at Hayhole, and others are projected at the Low Lights. The North-Eastern Railway Company, for the purposes of their own trade, have formed at Jarrow spacious dock accommodation, where, secure from any interruption, a considerable portion of the immense weight of coal shipped in the Tyne is annually loaded.

The outlay to accomplish this comprehensive scheme, notwithstanding the application of improved machinery, will be very large, far exceeding that ever incurred in a similar undertaking. The piers themselves are estimated, according to information communicated by Mr. P. J. Messent, the resident engineer of the works, to cost £660,000. That on the north side will, when finished, project 3000 feet into the sea, and that from the opposite bank 5400 feet. At the outer extremity it is calculated there will be a depth of 30 feet at low, and 45 feet at high water; the entrance itself being 1100 feet in width. Various plans were suggested for these important structures, that by Mr. James Walker being ultimately the one adopted. The Commissioners of the river sought to augment the value of their project, by enlarging the capacity of the area of the space to be enclosed by the piers, so that it might afford, in the most stormy weather, every security to any number of ships seeking its

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shelter. A Royal Commission examined the proposals of the promoters, and recommended that £250,000 should be contributed towards the construction of works, of really more than national importance, when it is considered the amount of property, and the number of valuable lives, not only frequenting our harbour, but passing along our coast every year. Whether the claims of other places asking to be similarly treated, or other considerations have deterred our Government from acting on the recommendation of their own Commissioners, is doubtful; all that is certain is, that no practical attention has been paid to their advice. To most minds ten times £250,000 would not be an extravagant sum to be bestowed by a country, to which maritime influence and power are of the importance they are to ours; and surely a nation, which spent above a million in one year towards protecting the liberty of the Turks, might spare one-tenth of that sum in ten years, in attempting to rescue from death some of those brave men who form the crews of our mercantile fleet.

The cost of those works, from the mouth of the river to Ryton, is estimated by Mr. Ure at £950,000, and in four years the portion up as far as Newcastle is expected to be completed, and the remainder in eight years from this date.

On the Northumberland Dock, now finished, £300,000 have been spent, and the estimate for that to be built at the Low Lights, is £500,000 or £600,000; so that the entire expenditure for these river and harbour works of the Tyne will not be less than £2,500,000; to which has to be added, £800,000 spent by the North-Eastern Railway Company on their docks at Jarrow; making a total of above £3,250,000 sterling devoted towards increasing the capabilities of the port.

The following is copied from a return, presented to the House of Commons, April 23, 1863, of the number of tons of coals, &c., shipped from the northern ports in the year 1862:—

		Coals.	Coke.	Patent Fuel.	Total.
Newcastle—Coastwise ..	..	2,109,313	24,726	960	2,134,999
Foreign ..	..	1,964,112	141,183	..	2,105,295
		4,073,425	165,909	960	4,240,294
Shields—Coastwise ..	..	147,529	..	..	147,529
Foreign ..	..	232,712	721	..	233,433
		380,241	721	..	380,962
Total Tyne ..	..	4,453,666	166,630	960	4,621,256
Sunderland—Coastwise ..	..	2,459,200	900	..	2,460,100
Foreign ..	..	1,133,642	32,354	..	1,165,996
		3,592,842	33,254	..	3,626,096
Hartlepoons—Coastwise ..	..	1,301,849	5,411	..	1,307,260
Foreign ..	..	188,659	23,942	..	212,601
		1,490,508	29,353	..	1,519,861
Middlesbro'—Coastwise ..	..	172,928	2,576	..	175,504
Foreign ..	..	34,051	20,449	..	56,500
		206,979	25,025	..	132,004
Stockton—Coastwise ..	..	846	..	..	846
Foreign ..	..	1,169	76	..	1,245
		2,015	76	..	2,091
Total ..	..	9,746,010	254,338	960	*10,001,308

The Collectors of the Customs have furnished the following particulars, for the year ending March 31, 1863 :—

	Newcastle.	North Shields.	South Shields.	Total.†
Duties received ..	£243,003	£43,186	£9,683	£295,872
Coasting Trade—				
Vessels { Cargoes inwards ..	2,600	516	282	3,398
{ „ outwards ..	10,747	949	52	11,748
Foreign { Cargoes inwards ..	1,477	271	176	1,924
Vessels { Ballast ..	3,009	1,405	328	4,742
{ Cargoes outwards ..	8,074	1,066	17	9,157
Total cargoes outwards, } coastwise, and foreign }	18,821	2,015	69	20,905

* Port of Newcastle includes Blyth and Warkworth. Sunderland includes Seaham.

† The duties received in the Tyne are, notwithstanding the great extension of our imports, £93,054 less than they were 1838. This is the result of the adoption of free trade.

		Number.		Tonnage.
Ships belonging to Newcastle	..	608	..	102,280
Do. North Shields	..	1,163	..	274,595
Do. South Shields	..	830	..	87,179
Total	..	2,101	..	464,054

In the year 1832 the port of Newcastle, including the whole of the Tyne, stood second in point of shipping in the kingdom, and possessed more vessels than the whole of Ireland, the list stood thus :—

	Ships.	Tonnage.	Seamen.
London ..	2,669	565,174	32,786
Newcastle ..	1,077	220,784	10,267
Liverpool ..	853	166,028	9,329
Hull ..	575	68,892	4,348
Glasgow ..	241	41,533	3,253
All Ireland ..	1,456	108,128	8,228

At the end of 1861 the figures stood thus—

		Number.		Tonnage.
Liverpool—Sailing Vessels	..	2,357	..	1,017,291
Steamers	..	239	..	80,787
		2,696		1,098,078
London—Sailing Vessels	..	2,425	..	692,491
Steamers	..	567	..	213,644
		2,992	..	906,135
Newcastle—Sailing Vessels	..	510	..	115,513
Steamers	..	124	..	12,233
		634	..	127,746
North and South Shields—Sailing Vessels	..	1,014	..	271,986
Steamers	..	159	..	3,292
		1,173	..	275,278
Total Tyne	..	1,807	..	403,024
Glasgow—Sailing Vessels	..	505	..	171,198
Steamers	..	173	..	47,369
		678	..	218,567
Hull—Sailing Vessels	..	519	..	49,918
Steamers	..	70	..	23,130
		589	..	73,048
All Ireland—Sailing Vessels	..	2,123	..	203,095
Steamers	..	175	..	44,585
		2,298	..	247,680

The large traffic floated on the waters of the Tyne frequently gives rise to a very animated scene, sometimes so many as 300 sail of vessels proceeding to sea at one tide. Mr. Ure, the engineer to the River Commissioners, in a report to that body, mentions that, in the year 1859, 18,878 ships entered the harbour, and 18,940 left it.

				Tons.
The weight of coals shipped in that year was	..	..	..	4,204,627
Merchandise exported oversea	..	..	..	109,170
Do. imported do.	..	..	..	166,992
The merchandise exported to, or imported from, coastwise is unknown, supposing it to be half that of the oversea, say				138,081
Ballast delivered in river as assessed ballast			233,787	
Do. for private use, viz., chalk, &c. for soda works, &c., &c.	..	..	..	272,643
				506,430
				506,430
Do. cast at sea, supposed	..	..	..	152,000
Total ballast				658,430
Goods carried by keels, &c. on river Mr. Ure estimates at..				1,500,000
Soil dredged by Commissioners and others, and carried to sea, estimated at				1,000,000
Total traffic on the river				7,625,300

A larger quantity than is carried on any river, according to Mr. Ure, except the Thames and Mersey, both of which are broad and deep compared with the Tyne.

These figures, probably, will convey to the mind, in more eloquent terms than the most laboured description, an idea of the magnitude of the commerce of the Tyne. In her great task of affording accommodation to the colossal manufacturing and mining enterprise of the North of England, she is ably assisted by her sister rivers the Wear and the Tees; the joint action of all three, as well as the roomy docks at East and West Hartlepool, Seaham, &c., being necessary to afford outlet to those endless streams of traffic, constantly converging towards their shores from all parts of those valuable mineral territories intersected by the numerous railways running over their entire extent.

The writer, in answering the appeal made to him by his

old friend the Editor of this work, has endeavoured to draw up an account of the history and gradual development of the general industry of the district. In doing this, he has availed himself of the labours of previous writers (due acknowledgment being always made), and of the considerate assistance of several friends personally engaged in several of the branches of manufacture described. The other portions of his task are the result of his own experience, and of information communicated to him by a generation which has all but passed away.

Whatever imperfections may be met with, he hopes they will be excused, on the ground of the shortness of the time allowed for its compilation, when taken in connection with other claims requiring more than usual attention. He trusts, however, that the task imposed upon him has been discharged with care enough, to have rendered sufficiently conspicuous the immense resources which lie at the disposal of the manufacturers of the North, and to have shown with sufficient distinctness, that they who have been engaged in turning these treasures to account for the general good of society, have discharged the duty in a manner worthy of their vocation, and of the intelligence of the times in which it is our privilege to live.

The Hall, Washington, 21st August, 1863.

NEWCASTLE-UPON-TYNE:

ANDREW REID, PRINTING COURT BUILDINGS.

ERRATA.

- Page 183, line 21, for "casualties," *read* casualties.
" 211, line 28, for "The temperature of that portion of the furnace on which the fresh coal is thrown has its temperature reduced," *read* That portion on which the fresh coal is thrown on has its temperature reduced.
" 222, line 25, for "In many places, much of," *read* In many places as much of.
" 229, line 22, for "arises," *read* occurs.
" 229, line 31, for "alkali," *read* alkalis.
" 230, line 19, for "aluminious," *read* aluminous.

SCHOOL OF GEOGRAPHY
UNIVERSITY OF OXFORD

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